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STUDIES IN SYPHILIS.¹

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THE epoch making researches of Schaudinn and Hoffmann (1905),⁽¹⁾ of Wassermann, Neisser and Bruck (1906)⁽²⁾ and of Ehrlich (1909)⁽³⁾ have focussed the attention of the medical profession on the scientific diagnosis and treatment of syphilis. During the past decade the great value of these pioneer discoveries has been thoroughly confirmed and the medical point of view regarding their clinical validity has been stabilized.

For several years Dr. S. W. Patterson and the writer had been investigating the serological diagnosis of syphilis in the army under conditions peculiarly favourable to correlating laboratory and clinical data. We had both independently been impressed by the reliability of one of the methods (that of Harrison) advocated by the special committee upon the standardization of pathological methods appointed by the Medical Research Council.⁽⁴⁾

On returning from abroad we were surprised to

meet with considerable scepticism amongst our medical colleagues regarding the great practical value of the Wassermann reaction in clinical practice.

It was therefore decided at this Institute that I should undertake a special study of syphilis, firstly completing a series of observations on the value of the cold and warm methods of performing the Wassermann test and later investigating the problems of latent and familial syphilis in the hospital population. For this purpose co-operation with the staffs of various metropolitan hospitals was established and much clinical material was made available. Everywhere assistance was given, but I wish specially to thank Dr. Robert Fowler, Honorary Surgeon at the Women's Hospital, Dr. Boyd Graham and Dr. Grieve, Resident Medical Officers at the Children's Hospital, and Dr. R. R. Stawell and Dr. Blois Lawton, Honorary Medical Officers at the Melbourne Hospital, for their stimulating co-operation during this investigation.

Throughout the study a systematic effort has been made to correlate accurately the serological findings with the clinical diagnosis. This proved a laborious proceeding, but it was felt that in no other manner could the real value of our laboratory methods be assessed.

The subject matter of this lecture is presented in two parts. Part I. deals with the serological diagnosis in 3,053 hospital patients with the utilization

¹ Read at a meeting of the Victorian Branch of the British Medical Association held at the Walter and Eliza Hall Research Institute, Melbourne Hospital, on September 6, 1921.

of the cold and warm methods of complement fixation. Part II. deals with certain sociological aspects of syphilis as we have encountered it in the hospital population.

PART I.

The Serological Diagnosis of Syphilis.

The Wassermann test is a colloidal reaction and is dependent on the fact that certain lipoidal extracts in the presence of syphilitic sera are capable of fixing a considerably greater quantity of complement than identical extracts mixed with non-syphilitic sera. In employing the test, accurate quantitative standardizations have to be carried out to insure that the serologist is working outside the range of complement fixation exerted by antigen in the presence of non-syphilitic sera.

When Wassermann, Neisser and Bruck applied the principles of the Bordet-Gengou phenomenon so successfully to the diagnosis of *lues*, utilizing the so-called specific extract of syphilitic liver as antigen, the test was accepted as a true antigen-antibody reaction. The discovery that extracts of non-syphilitic organs and lipoids could satisfactorily replace the specific extracts as antigens, served to raise much criticism regarding the mechanism of the test. Such antigens obviously could not be regarded as specific in the immunological sense. Noguchi⁽⁵⁾ and other workers subsequently investigated the nature of the substance in the sera of syphilitics concerned in the Wassermann reaction. Extracts of *Spironema pallidum*, when compared with lipoidal antigens, yielded quite different results in complement fixation tests with syphilitic sera. It was concluded, therefore, that Wassermann substance was not true antibody. Despite the limitations of our knowledge regarding the exact mechanism of the reaction, however, all modern work supports Kolmer's contention that, though technically the reaction is non-specific, in practice it proves to be a highly specific test. The Wassermann substance occurs only in the sera of syphilitics, with the exception, perhaps, of certain sub-tropical diseases, such as yaws and leprosy.

In a special report on the diagnostic value of the Wassermann test the Medical Research Committee⁽⁶⁾ conclude that the percentage of positive Wassermann reactions in active syphilis is so high that the test may, for all practical purposes, be regarded as specific.

Regarding the theoretical conception of the reaction, I would commend to you Noguchi's view, that it is dependent on a biological process peculiar to syphilis and that the Wassermann substance is produced by the interaction of *Spironema pallidum* on the tissues of the host. According to this view the measure of the Wassermann substance in the serum of the syphilitic affords an index to the activity of *Spironema pallidum*. From the clinical point of view, a Wassermann reaction should undoubtedly be regarded as indicating active syphilis and prompt therapeutic measures should be instituted.

Advances in Technique.

The changed views regarding the mechanism of the reaction have been accompanied by several dis-

tinct technical advances on the original method of carrying out the Wassermann test. Perhaps these may be broadly indicated as follows:

I.—Modification of Antigens.

The substitution of alcoholic extracts of syphilitic liver and of normal organs for the original aqueous extracts of luetic tissue constituted a distinct advance in technique. Still better results have been obtained by reinforcing such antigens as the alcoholic extract of heart muscle and the Noguchi and Bordet acetone-insoluble organ extracts with known quantities of cholesterol. Griffiths and Scott⁽⁷⁾ have recently advanced good reasons for substituting the acetone-insoluble lipoidal fraction for the more crude alcoholic extracts. The total amount of cholesterol in the final antigen is thus always accurately determined, for acetone-insoluble extracts contain no cholesterol.

II.—Multiple Tube Methods.

Following the conception of the quantitative nature of the reaction, multiple tube methods have largely replaced the original single tube test of Wassermann. Either the quantity of complement or of patient's serum is varied in these tubes, so that some quantitative estimation of the capacity of the patient's serum to fix complement in the presence of lipoids is made. The multiple tube method enables the serologist to grade the reaction and to assess its real value much more accurately than with any single tube technique.

III.—Ice-Box Fixation.

If the first stage of the reaction be conducted at ice-box temperatures for several hours instead of the customary period of one hour at 37° C., increased sensitiveness in serological diagnosis is attained. This method is definitely recommended by Griffiths, Scott, Eastwood and Harrison in their recent important communication on the Wassermann test (*Report on Public Health and Medical Subjects*, No. 1, Ministry of Health, 1920).

The actual technique used by different observers with the ice-box method differs considerably.

Firstly, the ice-box temperature adopted has varied between 0° C. and 8° C., while the period of time the system is left at this temperature has been from three to twenty-four hours.

At ice-box temperatures complement fixation, though slower, is often more complete than at 37° C.

In consequence of the greater time available and of the altered physical properties of the colloidal solutions at these low temperatures, certain slowly fixing serum-antigen combinations may absorb complement while not manifesting this tendency at 37° C. The general consensus of opinion amongst serologists who have investigated cold fixation, is that it increases the sensitiveness of the test in the diagnosis of syphilis and is of special value in estimating the efficacy of drug treatment in the cure of this disease. Not all observers, however, are agreed that the increase in sensitiveness is invariably specific, especially where the cholesterolized alcoholic extracts of heart are used as antigens. Pseudo-posi-

tive reactions have been reported with cold fixation, with sera which manifested no fixation when the test was conducted at the higher temperature. Provided certain precautions in technique be adopted, I am convinced that the tendency to pseudo-positive reaction is at least no more marked with ice-box than with warm fixation. The data dealing with this phase of the question will be considered in subsequent protocols.

Eastwood reviews the work of various serologists who have reported laboratory data as to the value of cold fixation for diagnosis. The list of published work is as follows: Jacobsthal (1910),⁽⁸⁾ Guggenheimer (1911),⁽⁹⁾ Altmann and Zimmern (1912),⁽¹⁰⁾ Altmann (1913),⁽¹¹⁾ Leredde and Rubinstein (1914),⁽¹²⁾ J. W. Smith and W. J. McNeal (1916),⁽¹³⁾ J. W. Smith and W. J. McNeal (1917),⁽¹⁴⁾ Fairley and Sullivan (1919).⁽¹⁵⁾

Technique Employed.

The general technique employed in both methods has been similar, except that with cold fixation slightly larger doses of complement are employed and contact with ice is limited to eight hours.

I.—The Antigen.

The antigen advocated by Fildes and McIntosh⁽¹⁶⁾ was the one originally employed, but during the past twelve months I have come to the conclusion that the proportion of cholesterol in was sometimes too high. As a routine the antigen is now prepared by taking 0.9 c.cm. of 1% cholesterol in alcoholic solution, adding this to 1.5 c.cm. of a 10% alcoholic extract of heart muscle, which is then rapidly mixed with 15 to 19 volumes of physiological saline solution (*i.e.*, a 1:16 to a 1:20 dilution). The necessary dilution for each batch of antigen is determined by preliminary titration. More than one-third of the anti-complementary dose of antigen should never be utilized. Between the tests the alcoholic solution of cholesterol is stored at room temperature and the alcoholic extract of heart muscle in the ice-chest.

II.—Suspensions of Red Blood Corpuscles.

A fresh suspension of 3% sheep corpuscles is prepared, the blood being collected into an equal volume of citrated saline solution from sheep especially kept for this purpose. The corpuscular suspension is sensitized with four to five minimum hæmolytic doses of hæmolytic serum (rabbit) and incubated for one-half of an hour at 37° C. Thereafter it is kept in the ice-chest until required.

III.—Specimens of Blood.

As a routine blood was obtained by needling the median basilic vein. The serum was diluted with four volumes of saline solution and heated for twenty minutes at 55.5° C. Complement and thermolabile anti-complementary substances in the serum were thereby destroyed. Tests were performed bi-weekly. As far as possible fresh specimens of blood were used (twenty-four hours), but frequently they had been collected 48 to 72 hours previously. Any serum exhibiting anti-complementary tendency in the serum control tube or any specimen in which microbic contamination was suspected,

was discarded and a fresh one retested at a later date. Cerebro-spinal fluids were neither diluted nor heated, but were used in the pure condition in unit volumes (0.1 c.cm.) in the final test.

IV.—Complement.

The complement was obtained from the sera of healthy male guinea-pigs killed on the day of the test. It was incubated in centrifuge tubes for twenty minutes at 37° C. immediately after collection; the clot was then separated, centrifuged and left in contact with ice for three hours before use. The sera from the different pigs were finally pooled.

In the preliminary titration the hæmolytic value of the pooled complement was determined, the dilutions of complement ranging from 1:10, 1:20, 1:30 to a 1:80 solution. Each tube contained one volume of sensitized corpuscles (3%), one volume of varying dilutions of complement and three volumes of saline solution.

The susceptibility of the complement to be fixed by antigen was not determined in the preliminary titration, but in the final test a control was always used containing a double volume of antigen and one volume each of saline solution and complement (three minimum hæmolytic doses). Complete hæmolysis in this control was demanded and from it one could always determine that the pooled complement was not excessively sensitive to antigen. Griffiths and Scott recommend that this property of complement should be investigated in the preliminary titration.

The Arrangement of the System for the Final Test.

Small volumes of reagents were measured by Donald's dropping pipettes, a series of standard pipettes dropping 0.05 c.cm. being adopted. The total volume of reagents in the final stage of the reaction was 0.5 c.cm. and each unit volume equalled 0.1 c.cm.. A multiple tube method was used, the racks containing four rows, four tubes being used for each serum tested. The last tube was the serum control.

The system was put up as follows:

Reagents.	Row I.	Row II.	Row III.	Row IV.
	c.cm.	c.cm.	c.cm.	c.cm.
<i>Stage I.</i>				
1. Antigen	0.1	0.1	0.1	—
2. Serum	0.1	0.1	0.1	0.1
3. Saline Solution	0.1	0.05	—	0.2
4. Complement	0.1	0.15	0.2	0.1
<i>Stage II.</i>				
5. Sensitized Corpuscles ..	0.1	0.1	0.1	0.1

In the warm method complement was diluted, so that one volume (0.1 c.cm.) contained three minimum hæmolytic doses. The actual amounts of complement present in this system was three, four and a half, six and three minimum hæmolytic doses. With the ice-box method the complement was so diluted that a unit volume (0.1 c.cm.) contained four minimum hæmolytic doses and the actual amounts present in this system was four, six, eight and four minimum hæmolytic doses.

As controls known syphilitic and known non-syphilitic sera should be included in the series.

The serum control tube, Row IV., should be carefully watched for anti-complementary tendency. If this be detected, no reading should be made, the blood being tested at a subsequent date.

Additional controls were put up as follows:

- (1) Complement control (complement, 0.1 c.cm.; saline solution, 0.3 c.cm.).
- (2) Antigen control A (complement, 0.1 c.cm.; antigen, 0.1 c.cm.; saline solution, 0.2 c.cm.).
- (3) Antigen control B (complement, 0.1 c.cm.; antigen, 0.2 c.cm.; saline solution, 0.1 c.cm.).

The two antigen controls show that antigen itself is not fixing excess of complement; they also indicate that the pooled complement is not excessively sensitive to antigen (*i.e.*, not fixed by a double dose of antigen).

All these controls must be fully hæmolyzed before the system is regarded as working reliably.

The period of incubation with the warm method for Stage I. varied from one to one and a quarter hours at 37° C., while with cold fixation the trays were placed on blocks of ice in the ice-chest for a period not exceeding eight hours. Originally I used a temperature of 8° C., but a temperature of 0° C. is now adopted.

In Stage II. the trays are incubated for one hour at 37° C., final readings being recorded at the end of this period.

The Method of Reporting Results.

The same nomenclature in recording results is adopted for both methods.

A "P +++" reaction indicates an entire absence of hæmolysis in the first three tubes and is recorded as a strongly positive reaction.

A "P ++" reaction means that there is an absence of hæmolysis in the two tubes of Row I. and Row II. and is regarded as a definitely positive reaction.

A "P +" reaction indicates an absence of hæmolysis in the tube of Row I. only and is regarded as

partially positive. It may be accepted as definite evidence of syphilis in a treated case and is also of value in the diagnosis of early primary lesions and of familial syphilis. In all cases, however, the diagnosis should never depend entirely on this type of serological evidence. Unless stigmata of syphilis are present, the blood should invariably be retested at a subsequent date.

On the other hand, with "P +++" and "P ++" types of reaction, which have been confirmed on retesting, this serological evidence may be safely accepted as indicating syphilis, even in the absence of any clinical support for such a diagnosis.

An Analysis of 3,053 Cases Investigated by Cold and Warm Methods of Complement Fixation.

The sera investigated by the warm and cold methods with the above described technique number 3,053. Of these, 1,134 were of persons regarded as being definitely or probably syphilitic or of persons being treated for syphilis, while 1,919 were of persons regarded on clinical grounds as probably not syphilitic. When a serum yielded a positive serological result in the absence of clinical manifestations or history, it was generally retested.

Particular difficulty was experienced in classifying certain cases as latent syphilis in which Wassermann reactions were obtained. Evidence has steadily accumulated in the clinical history of these patients (a history of venereal infection and the obstetric history), in the presence of serological and clinical syphilis in collaterals and in *post mortem* findings, showing that a consistent definitely positive Wassermann reaction in this country means syphilis.

When in the absence of clinical evidence of *lues* a former definite positive serological diagnosis was not confirmed on retesting, the first serological result was regarded as a pseudo-positive reaction in a patient not suffering from syphilis. Fortunately, such cases have proved exceedingly rare, constituting only 0.4% of cases investigated by cold fixation and 0.3% with the warm method. If care be taken to exclude the possibility of such sources of error as wrong labelling or mixing of specimens, either in the ward or laboratory, pseudo-positive reactions in the sera of non-syphilitics in this coun-

Protocol No. 1.—The Cold and Warm Methods of Complement Fixation in Certain Protozoal Diseases.

Disease.	Total Number of Cases.	Pyrexial Period.						Apyrexial Period.			
		Number Examined.	Ice-Box.		Warm.		Number Examined.	Ice-Box.		Warm.	
			Positive.	Partial.	Positive.	Partial.		Positive.	Partial.	Positive.	Partial.
Benign Tertian ..	19	12	—	3	—	3	7	—	—	—	—
Malignant Tertian	44	34	2	8	1	9	10	—	—	—	—
Relapsing Fever..	32	10	1	—	1	—	22	3	—	3	—
Oriental Sore ..	5	—	—	—	—	—	5	—	—	—	—
Amœbic Dysentery	8	—	—	—	—	—	8	—	—	—	—
Totals	108	56	3	11	2	12	52	3	—	3	—

Protocol No. 2.—An Analysis of the Results Obtained by the Two Methods in 1,919 Cases Probably Not Syphilitic.

Method.	Total.	No Reaction Obtained.	Protozoal Diseases.			Non-Protozoal Diseases.		
			Total.	Positive.	Partial.	Total.	Positive.	Partial.
Ice-Box Fixation	1,919	1,868	108	6	11	1,811	7 or 0.4%	27 or 1.5%
Warm Fixation	1,919	1,837	108	5	12	1,811	5 or 0.3%	60 or 3.3%

try must be regarded as phenomena of extreme rarity.

While in Egypt the late C. F. Sullivan, B.Sc., and the writer⁽¹⁷⁾ investigated the reaction of the sera of 108 Australian light horse men who were suffering from various protozoal diseases. At that time we ascribed certain positive results which occurred in cases of malaria and relapsing fever, as proof of the existence of pseudo-positive reactions in non-syphilitic subjects. Since studying the question of latent syphilis in more detail, however, and having regard to its incidence in the hospital populace, I am extremely doubtful of the validity of our former conclusion. Our actual figures are tabulated in Protocol No. 1.

In the 1,919 sera regarded as probably not syphilitic in the great majority no response was obtained with either method. The actual results obtained are set out in Protocol No. 2.

A perusal of this protocol shows that the tendency to strong pseudo-positive reactions was slightly accentuated by cold fixation (0.1%). On the other hand, fewer partial reactions were met with, an advantage largely due to the greater amount of complement in Row I. in the ice-box method. The incidence of partial results (P +) in non-syphilitic sera has been sufficiently common to prove the necessity for caution in the interpretation of this reading. It is possible that incubation in a water bath at 37° C., instead of in the incubator, would have diminished the tendency to this type of pseudo-reaction.

The Serological Results in 1,134 Cases of Definite or Probable Syphilis Obtained by the Two Methods.

The group is subdivided into treated and untreated cases and the serological diagnosis has been considered in separate protocols. The customary classification has been adopted, but a special group of *post mortem* material is included. All these cases, which were investigated by Patterson and Johnston, were considered to be instances of syphilitic aortitis; the two cases in which no serological results were recorded, showed only limited pathological changes in the ascending aorta.

The Diagnostic Value of the Wassermann Reaction in the Various Stages of Syphilis.

I.—Primary Syphilis.

The Wassermann reaction leaves much to be desired in the diagnosis of *lues* in the early stage of the primary sore. Fortunately, in the examination of the sore for *Spironema pallidum* by dark ground illumination there is at the disposal of the clinician a laboratory method yielding a very high percentage

of definite results. This is the correct method of diagnosing primary syphilis.

It is noteworthy that in this series of 83 cases several of the sores were not typical Hunterian chancres, yet the patients' sera showed positive Wassermann reactions.

The routine practice in connexion with any venereal sore of examining immediately for *Spironema pallidum* and of making two Wassermann tests at intervals of three weeks would prevent many errors in clinical diagnosis. Mixed infections in venereal sores do occur, for *Spironema pallidum* may sometimes be isolated from multiple soft sores in patients who later develop Wassermann reactions.

II.—Secondary Syphilis.

The serological diagnosis of secondary syphilis is eminently satisfactory. I have never examined the serum of a secondary syphilitic which failed to yield a reaction to the ice-box method. In this series the percentage of positive results with warm and cold fixation were 97.7% and 100% respectively. The practical significance of such findings is considerable, for the clinician is able to determine whether any rash which resembles that seen in secondary *lues*, is syphilitic or not.

III.—Tertiary Syphilis.

Perhaps the greatest value of the ice-box method in serological diagnosis is seen in tertiary syphilis, 249 out of 255 sera yielding positive results. A clear gain of 23, or 9%, was demonstrated by cold fixation.

Unfortunately, time will not permit a detailed account of the serological diagnosis of syphilis affecting the various viscera, but the following protocol is included, as it demonstrates the definite

Protocol No. 3.—The Serological Diagnosis by Warm and Cold Fixation in Untreated Syphilitics.

Stage of Disease.	Total Number of Cases.	Positive.		Total Gain.
		Warm.	Cold.	
Primary ..	83	54 = 65.1%	62 = 74.7%	8 = 9.6%
Secondary ..	88	86 = 97.7%	88 = 100.0%	2 = 2.3%
Tertiary ..	255	226 = 88.6%	249 = 97.6%	23 = 9.0%
Latent ..	121	108 = 89.3%	116 = 95.9%	8 = 6.6%
Congenital ..	55	41 = 74.5%	49 = 89.1%	8 = 14.5%
Post Mort'm ..	25	23 = 92.0%	23 = 92.0%	—
Totals ..	627	538 = 85.8%	587 = 93.6%	49 = 7.8%

superiority of the ice-box method in a blood examination in syphilis of the nervous system.

I have seen three patients with tabes, whose cerebro-spinal fluid yielded strongly positive reactions to both the warm and the cold methods, while no reaction was obtained with the blood to the former, although the reaction was strongly positive to the latter. Surely such findings afford incontrovertible evidence as to the value of the method.

The importance of having specimens of cerebro-spinal fluid examined in all cases suspected of neurological syphilis cannot be over-estimated.

The customary practice of being satisfied with a blood examination for this purpose should not be followed, because a reaction or the failure of the test to yield a reaction may be misleading.

As is shown in Protocol No. 4, the blood serum of patients with neurological syphilis sometimes does not yield a reaction. On the other hand, the blood may yield a reaction in a syphilitic patient with some non-syphilitic lesion of the central nervous system. Since the cerebro-spinal fluid in nearly every case of syphilis of the nervous system fixes complement in the Wassermann test, no neurologist can afford to dispense with the serological and cytological examination of this fluid.

Protocol No. 4.—Examination of the Blood by the Two Methods in Neurological Syphilis.

Type of Syphilis.	Total Number of Cases.	Positive.		Total Gain.
		Warm.	Cold.	
Interstitial Parenchymatous—	25	24 = 96.0%	25 = 100.0%	1 = 4.0%
(a) Tabes	20	15 = 75.0%	19 = 95.0%	4 = 20.0%
(b) General Paralysis of the Insane ..	6	6 = 100%	6 = 100.0%	—
Neuritis ..	4	3 = 75.0%	4 = 100.0%	1 = 25.0%
Totals ..	55	48 = 87.3%	54 = 98.2%	6 = 10.9%

Apart from the distinct advantage of the ice-box method, as demonstrated in Protocol No. 4, there is another gain which these figures do not show. If any large series of reacting sera be taken, it will be found that cold fixation has converted a number of border line (P +) reactions into definite and strongly positive results (P ++ and P +++).

IV.—Latent Syphilis.

The most astounding feature of the syphilitic process is its latency. By latency one does not imply spirochætal inactivity, but rather that the *Spirochæta pallidum* lies hidden within the viscera, producing insidious pathological changes not detected by present clinical methods. Not infrequently the diagnosis in such a case depends entirely on a con-

¹ The cerebro-spinal fluid in the twentieth case was unfortunately not sent for examination. The blood serum did not yield a reaction.

Protocol No. 5.—Types of Reaction in the Fifty-Five Cases of Neurological Syphilis.

Method.	Partially Positive (P+)	Positive (P++)	Strongly Positive (P+++)	Negative.
1. Warm ..	5	2	41	7
2. Cold ..	0 ¹	1	53	1

sistent Wassermann reaction. A history of chancre may be given, but, more often, though promiscuous sexual intercourse is admitted, there is no knowledge of venereal infection. In females the obstetrical history is important, while a clinical and serological survey of the familial collaterals may afford confirmation of the diagnosis. When persons affected with latent syphilis come to autopsy, confirmation of the serological diagnosis has repeatedly been forthcoming.

Patterson and Johnston have correlated the results of the serological diagnosis with the *post mortem* findings and their conclusion entirely corroborates that of Turnbull,⁽¹⁸⁾ namely, that the Wassermann reaction as controlled by autopsy is a diagnostic weapon of astonishing precision.

The reality of latent syphilis is well illustrated in Protocol No. 6. Of these persons included, 52% presented no clinical evidence of aortitis before death, yet at autopsy syphilitic aortitis was demonstrated.

Protocol No. 6.—Latent Syphilis and Syphilitic Aortitis: A Post Mortem Study (Patterson and Johnston).

Total No. of Cases.	Post Mortem.			Serological.	Clinical Diagnosis.	
	Ascending Aorta.	Aortic Valves	Aneurysm.	Wassermann Test (P+)	Not Syphilitic.	Syphilitic.
25	19	6	5	23	13 = 52%	12 = 48%

V.—Congenital Syphilis.

This series of observations on congenital syphilis is not a large one, but some interesting problems developed during the investigation. The increased sensitiveness of the ice-box method was demonstrated repeatedly with the umbilical or sinus blood collected at birth. Actually, in nine infants whose serum failed to yield a reaction with the warm fixation method, a definitely positive reaction was obtained with the ice-box technique, yet the mother's blood in every case gave a definitely positive result to both methods. It is important, however, to realize that in the test such increased sensitiveness may or may not be important in clinical work. A Wassermann reaction at birth does not necessarily indicate infection of the infant with

¹ Note the entire absence of partially positive reactions with the ice-box method.

Spiroplasma pallidum, for the reaction may be given by the residual Wassermann substance which has traversed the placental barrier from the maternal circulation. In two cases of the series yielding positive results at birth spontaneous disappearance from the serum of the power to fix complement was observed within a few weeks. In one case the reaction had been obtained with both methods, while in the other it had been obtained only with the ice-box method.

This increased sensitiveness of ice-box fixation was not sustained in investigating older congenital syphilitics. Here the method of warm fixation proved quite as satisfactory as the ice-box technique.

Two infants in the first few weeks of life presented rashes which were regarded as syphilitic, yet no serological reactions were obtained. Perhaps the time factor was important and later different results might have been observed. In *syphilis congenita tarda* the results were by no means unsatisfactory. Strong serological reactions were observed in cases of congenital syphilis well advanced in the third decade of life.

The Wassermann Reaction as an Index to the Efficacy of Treatment.

Few clinicians to-day would be prepared to estimate the prognosis and to undertake the treatment of syphilis without serological data to assist them.

It has long been recognized that the mere disappearance of clinical lesions under drug treatment rarely constitutes a cure. When the Wassermann test was introduced, it was hoped that an absolute index to cure would be available. While the disappearance of the power of the serum to fix complement in the Wassermann test in certain cases (*i.e.*, in primary syphilitics) frequently indicates that all the *spiroplasmata* have been killed off, yet in others treated later in the disease the failure to obtain a serological reaction does not indicate cure. Apparently, in these cases, though many *spiroplasmata* have been killed, others remain either in an inert form or in some inaccessible location and months or years after the cessation of the therapy, they again become active pathogenic agents. In any such case of relapsing syphilis it is a fact both of importance and interest that the serological reaction may be elicited a considerable period of time before clinical manifestations reappear.

From the standpoint of prognosis the clinician desires to know not only that the serum has lost the power to give rise to a Wassermann reaction as a result of treatment, but that this state of affairs persists over a period of at least two years after the complete cessation of treatment.

Many clinicians, including Sir Clifford Allbutt,⁽¹⁹⁾ are now recommending lumbar puncture as a routine method if the secondary stage has been reached, treatment being controlled from time to time by parallel tests of both blood and cerebro-spinal fluid. Craig⁽²⁰⁾ has recently stated that no syphilitic patient has been given the best that it is possible for medical science to give him, either in the way of diagnosis or treatment, if the thorough examination of the cerebro-spinal fluid has been omitted. With this position I am in complete agreement.

Regarding treatment, it may be stated that both clinical and serological data indicate the advisability of treating intensively with mercury and of the intravenous administration of the synthetical arseno-benzol compounds until no reaction is obtained to the Wassermann test and thereafter of administering mercury *per os* intermittently over a period of two years.

In the present investigation the sera of 507 treated syphilitics have been examined by both the warm and the cold methods of complement fixation. With the exception of the congenital group the routine treatment has consisted of from four to ten intravenous injections of preparations allied to salvarsan (*i.e.*, arseno-benzol, galy and novarsenobillon) combined with intensive mercury treatment (frequently by injection or inunction for at least two months). In the congenital group, though many received subcutaneous injections of novarsenobillon, others were subjected to prolonged mercury treatment only for a period of one to three years.

An examination of Protocol No. 7 reveals several important findings.

Protocol No. 7.—Treated Syphilitics: A Comparison of the Two Methods in a Series of 507 Cases.

Type of Syphilis.	Total Number of Cases.	Positive.		Total Gain.
		Warm.	Cold.	
Primary ..	151	40 = 26.5%	44 = 29.1%	4 = 2.6%
Secondary ..	170	62 = 36.5%	81 = 47.6%	19 = 11.1%
Tertiary ..	125	82 = 65.6%	97 = 77.6%	15 = 12.0%
Latent ..	33	25 = 75.7%	24 = 72.7%	-1' = -3.0%
Congenital ..	28	14 = 50.0%	14 = 50.0%	—
Totals ..	507	223 = 44.0%	260 = 51.3%	37 = 7.3%

In the treatment of primary, secondary and tertiary syphilis the ice-box method affords a much more sensitive index to the efficacy of therapy than does warm fixation. Thus, of 170 patients treated for secondary syphilitic manifestations, the serum of nineteen yielded definite reactions to the ice-box method, but none when the warm fixation method was employed. Similar results were obtained in fifteen patients with tertiary lesions. As a consequence, in these cases intensive treatment would be continued until the serum no longer yielded reactions, unless any of them proved to be "Wassermann-fast."² The more sensitive the serological diagnosis becomes, the greater is the difficulty in causing the disappearance of Wassermann reactions under treatment. Fortunately, however, the incidence of relapsing syphilis under such condi-

¹ This patient's serum gave only a partially positive result (P+) to the warm method of fixation; no reaction was obtained with the ice-box technique.

² The patient with "Wassermann-fast" serum has generally come under treatment in the tertiary stage. Despite repeated courses of salvarsan and mercury the serological reaction remains strongly positive. Evidently the *spiroplasmata* are so anatomically situated as to be inaccessible to drugs or have developed a strain resistant to arsenic and mercury. Such patients must receive mercury medication for life. The prognosis is not good; the aorta or central nervous system may be involved.

tions is more rare and the ultimate result of therapy more satisfactory.

The importance of the time factor in the treatment of syphilis cannot be over-estimated. The earlier in the disease intensive treatment is instituted, the less the chance of involvement of the central nervous system and the aorta and the better the therapeutic results. In the series under investigation Wassermann reactions persisted in only 29.1% of the cases of primary syphilis, in 47.6% of the cases of secondary syphilis and in 77.6% and 72.7% of the cases of tertiary and latent syphilis respectively.

These figures, which represent the result of one serological examination, are not indicative of absolute cure. They do, however, demonstrate the susceptibility of *spirochetes* to intensive therapy at different stages of the syphilitic infection and, provided mercurial treatment be continued for a sufficient period, indicate that satisfactory results may be anticipated.

Conclusions.

The advantages claimed for ice-box fixation, with the utilization of the technique outlined above, may be summarized as follows:

1. It has proved definitely superior to warm fixation in the serological diagnosis of primary, tertiary and latent syphilis.
2. It has afforded a more accurate index to the efficacy of drug treatment in *lues*.
3. Over a large series of cases the tendency to pseudo-positive reaction has certainly not been accentuated by this method. Thus, the serum of two patients which failed to react with the warm fixation technique, yielded definite pseudo-positive reactions to the ice-box technique; in thirty-three other cases the serum which registered partially positive reactions to the former, did not yield reactions at all to the latter.
4. The ice-box method has repeatedly converted border-line or partially positive reactions (P +) as yielded by warm fixation, into definitely positive types of reaction (P ++ and P ++++) where the clinical evidence of syphilis was incontrovertible.

PART II.

Concerning Certain Sociological Aspects of Syphilis Affecting the Hospital Population.

Within the metropolitan hospital population syphilis is a common disease. Fowler's figures for the Women's Hospital indicate a deplorable incidence amongst women of the child-bearing period, while the data being collected at the Melbourne Hospital by Patterson and Johnston during *post mortem* examinations, combined with serological observations, confirm the conclusions of Allen⁽²¹⁾ regarding the great prevalence of syphilis in our midst. The object of this paper, however, is not to discuss the proportion of our hospital class that is syphilitized, but rather to indicate the relationship between age, sex, marital state and the clinical type of syphilis as it is manifest in out-patient clinics and in the wards. Especially I wish to emphasize the dominance of the latent and tertiary types and to impress upon the reader the importance of in-

vestigating and treating syphilis as a familial disease.

In Protocol No. 8 an analysis of 522 consecutive cases of syphilis from our series has been made and the clinical type has been correlated with the sex.

Protocol. No. 8.—The Relationship Between the Sex and the Clinical Type of Syphilis.

Sex.	Primary.	Secondary	Tertiary.	Latent.	Total.
Male ..	39	47	151	36	273
Female	7	28	75	139	249
Totals.	46	75	226	175	522

The great preponderance of tertiary and latent syphilis will be noticed, the tertiary being the most common form in the male and the latent the most frequent in the female. This conclusion is reached after due regard is had to the longer attendance of patients suffering from tertiary syphilis in hospital clinics.

Regarding the incidence of latent syphilis in females, these figures (55.8%) might be criticized on the basis that many of our patients were derived from a survey of healthy women in the obstetric clinics. The same high incidence of latent syphilis, however, was found in the patients in the Melbourne Hospital, where primary and secondary and tertiary syphilis in females is constantly being treated. I am convinced that latent syphilis is the most common type occurring in females attending hospitals.

Another feature worthy of comment is the infrequency of demonstrable primary chancres in the female (2.8%) as compared with the male (10.6%). This condition in females is rarely treated until secondary lesions appear and these, too, are often suppressed. All the available data supports Fowler's contention that the results of the Wassermann test should be investigated as a routine on every pregnant mother attending the ante-natal clinics of the maternity hospitals.

Protocol No. 9 calls for little comment. It should be noted that primary and secondary syphilis are most common in the third and fourth decades, while

Protocol No. 9.—The Relationship Between Age and the Clinical Type of Syphilis.

Decade.	Primary.	Secondary.	Tertiary.	Latent.
10-20	4	9	1	6
21-30	20	38	35	41
31-40	11	19	53	32
41-50	6	5	58	9
51-60	0	2	51	7
61-70	2	0	16	1
71-80	0	0	5	0
Unclassified.	3	2	7	7
Totals ..	46	75	226	139

¹ These were patients at the Women's Hospital and were all within the third or fourth decade.

tertiary lesions are seen most frequently in the fourth, fifth and sixth decades. Latent syphilis in females was very common in the third and fourth decades of life—the child-bearing period! The greater number within these two decades is partly due to the fact that these decades were the ones especially investigated in females.

In Protocol No. 10 Stawell's classification of syphilis into acute and chronic has been adopted. Of the 330 patients considered, 32.7% were single, 53.6% were married and 13.6% had previously been married.

Protocol No. 10.—Marital State.

Type of Syphilis.	Total.	Single.	Married.	Widow or Widower.
Acute Syphilis (Primary & Secondary) .	79	48 = 60.8%	23 = 29.1%	8 = 10.1%
Chronic Syphilis (Latent and Tertiary)	251	60 = 23.9%	154 = 61.4%	37 = 14.7%
Totals	330	108 = 32.7%	177 = 53.6%	45 = 13.6%

It will be seen that 29.1% of the acute syphilitic infections (primary and secondary) occurred in people who were legally married, whereas 61.4% of chronic syphilitics belonged to the married class and another 14.7% to people who had been married.

The establishment of venereal diseases clinics for the diagnosis and treatment of acute syphilis is of great national importance, but such measures largely deal with only one aspect of the problem. Owing to the insidious nature of syphilis, there must still remain a definite proportion of males and a much larger proportion of females in whom primary and even secondary lesions will not be suspected or manifest. It is this wide-spread distribution of tertiary, latent and familial syphilis in the married section of our hospital population that constitutes so depressing a picture from the sociological point of view.

Familial Syphilis.

The subject of familial syphilis is not one purely of medical interest; it is also of vital importance to the whole community. The problem is frequently complicated by the latency of the syphilitic infection, especially in the mother and to a lesser degree in the father and the children.

Protocol No. 11.—The Relationship Between Husband and Wife (Forty-Three Families).

Wassermann Reaction.	Wassermann Reaction.	Wassermann Reaction.
Father + } 20	Father + } 10	Mother + } 13
Mother + }	Mother — }	Father — }

The husband and wife in 20 of these 43 families both yielded positive Wassermann reactions, but in the remaining 23 families, one or other person showed a complete absence of clinical and serological signs of syphilis. The reason for this apparent anomaly is to be found in the fact that the majority of the hospital class acquire acute syphilis prior to marriage. They marry later in life, when the disease is in a more chronic stage (latent and tertiary). During this later period the infectivity of the disease is minimal. It is common experience to find a male tertiary syphilitic who has never infected his wife and has healthy issue. Mott⁽²²⁾ explained the non-infectivity of males suffering from general paralysis of the insane on the basis of the absence of *Spironema pallidum* in the semen. Out of a series of 100 consecutive cases of general paralysis of the insane, *spironemata* were demonstrated in the brain in 64, yet in a parallel examination of the testicles in fifty of them no spirochaetes were discovered.

Protocol No. 12.—The Relationship Between Mother and Issue (Fifty Families).

	Wassermann Reaction.		
	Mother + Issue +	Mother + Issue -	Mother - Issue +
At Birth . .	24 ¹	2	0
Later	15	5	4
Totals	39	7	4

The serological examination of the maternal and infant's blood at birth showed positive results in 24 infants out of 26. Such evidence, however, is insufficient to justify a definite diagnosis of syphilis in the child. Re-examination in two months' time will afford the necessary information and, if the reaction be sustained, the child should be placed under anti-syphilitic treatment.

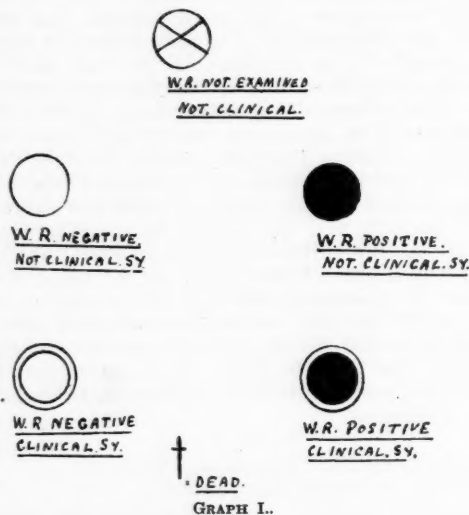
The Incidence of Congenital Syphilis Amongst Different Members of the Same Family.

A puzzling aspect of familial syphilis is the irregularity of the manifestations of congenital *lues* in members of the same family. Some families are universally syphilized, all the members being infected. In others a series of still-births and congenital syphilitic children are followed by an apparently healthy stock. In these families there is the irregular variety, in which robust, fine looking, healthy children, whose serum does not react to the Wassermann test, are interspersed between offspring presenting congenital stigmata and positive serological evidence of disease.

These features are well illustrated in the syph-

¹ The demonstration of a Wassermann reaction with the blood of the infant at birth does not necessarily mean syphilis in the child.

KEY TO FAMILY TREE



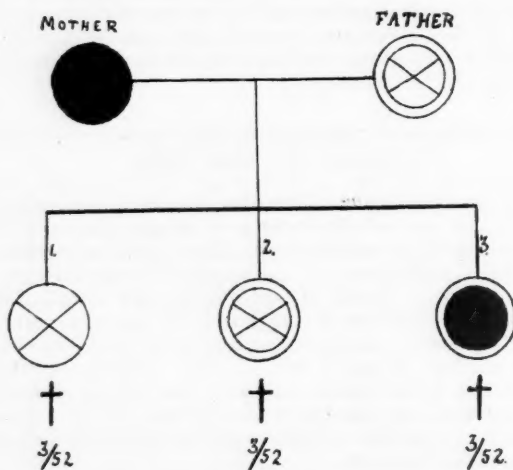
ilitic families occurring in the series of cases under review. (See Graphs I. to VIII..)

A.—Complete Syphilization of the Family.

The family trees (Nos. 1, 2 and 3) illustrate the disastrous consequences that may be caused by hereditary syphilis.

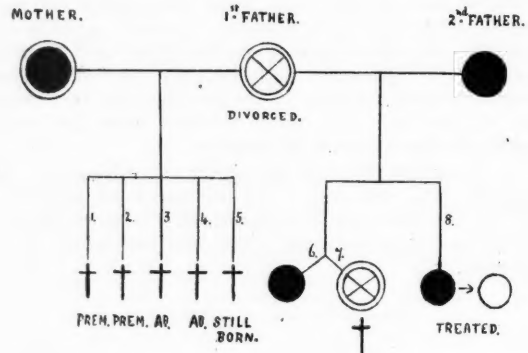
Family No. 1.—The mother stated that she was miserable on account of a series of dead infants, but otherwise she felt perfectly well. She denied all knowledge of venereal infection, but refused to live with her husband, who had admitted that he had been treated for syphilis one year prior to marriage.

Family No. 2.—The mother, who was a healthy



FAMILY No. 1.

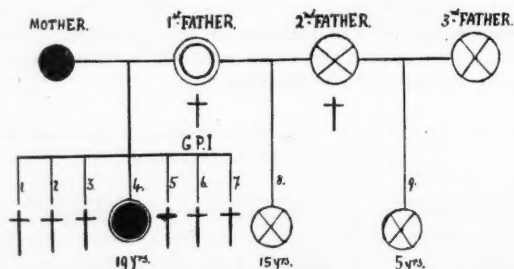
GRAPH II.

FAMILY No. 2.
GRAPH III.

looking woman, stated that she had had two abortions, two premature births and one still-born child during her first marriage. Her first husband, whom she later divorced for desertion, had admitted syphilitic infection. The mother was treated with mercury for nine months and, assuming she was cured, had remarried. Three children have been born to this second marriage. On investigation, the second husband and the two surviving children all give strongly positive Wassermann reactions. It will be noted that the response to the test of the serum of the youngest child has since disappeared under intensive anti-syphilitic treatment.

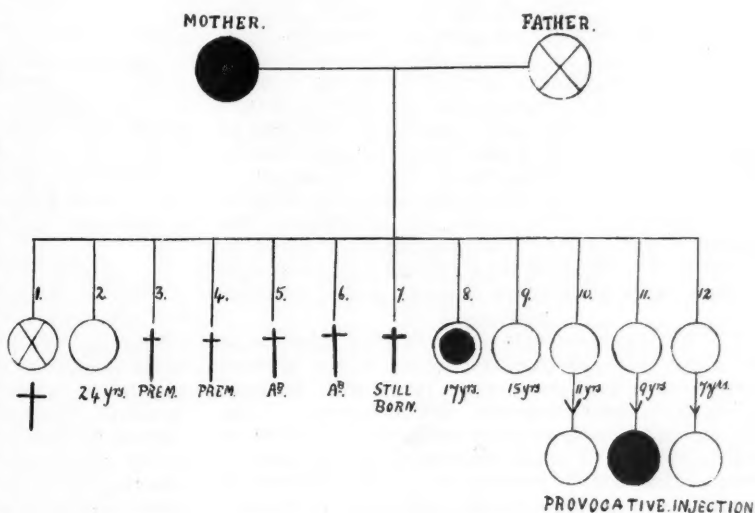
Family No. 3.—The mother stated that she felt perfectly well, but came to hospital with her son, aged 19 years, who suffered from deafness. He was a typical congenital syphilitic. The Wassermann reaction was strongly positive in the sera of both (P +++). The first husband, whose vocation was that of a Methodist clergyman, had died from general paralysis of the insane. Six out of seven pregnancies resulting from this first marriage had terminated fatally to the offspring. The children of the two subsequent marriages could not be investigated, owing to lack of co-operation on the part of the parents.

It is a deplorable fact that no legal measures exist in this State enabling children to receive the benefits of anti-syphilitic treatment in the event of the parents refusing to assist the physician.

FAMILY No. 3.
GRAPH IV.

B.—Congenital Luetics Followed by an Apparently Healthy Stock.

Family No. 4.—Both the mother and father appeared healthy, but the former proved to be a latent syphilitic. Out of six consecutive children (No. 3 to No. 8) two died prematurely, two were abortions and one at full time was still-born. Child No. 8 was a typical congenital syphilitic. The subsequent four children appeared healthy and their sera did not yield a reaction to the Wassermann test. None of them had ever manifested clinical evidence of *lues*. The three youngest were subsequently given provocative injections of salvarsan and the serum of the eleventh child developed a partial positive reaction (P +) on the seventh day with the method of "warm fixation." This blood did not react to the test with the ice-box technique. This proved to be the only case in our series where the Wassermann reaction was modified by a provocative salvarsan injection.



FAMILY No. 4.
GRAPH V.

C.—The Irregular Incidence of Congenital Syphilis in the Members of Certain Infected Families.

Family No. 5.—The mother gave a history of a criminal assault at the age of 14 years, from which she had acquired *lues*. Two years later she married and has been twelve times pregnant. Though attending hospitals with syphilitic children, she herself has never been advised to undergo treatment.

Her ninth and tenth children are twins, aged 8½ years. They are bright, intelligent boys, with no clinical evidence of syphilis. Yet the two children

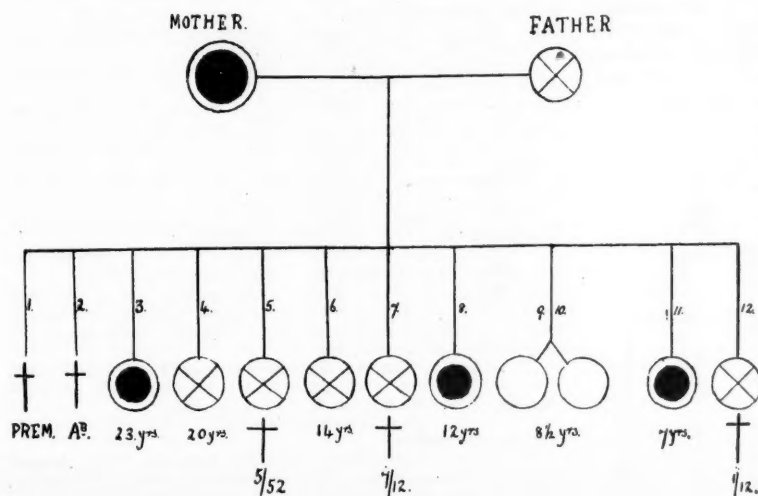
next to them, one older and one younger (the eighth and eleventh) are typical congenital syphilitics, whose blood yields a strong Wassermann reaction.

Since I drew up the family tree, the sixth child has been investigated. She is an intelligent girl of remarkable physique and, though only 14 years of age, poses in the factory where she works as a girl of 16 years, earning £2 5s. per week. Her blood does not give rise to a reaction. The elder sister (the third child) presents the typical stigmata of congenital *lues* and her blood serum yields a reaction to the test.

If syphilis be regarded as a protozoal disease, the explanation of this irregularity might lie in the fact that there is some sort of periodicity underlying the

activity and infectiveness of *Spirochaeta pallidum*, so that at certain times the mother bears children infected with *spirochaeta* and at other periods healthy ones. Of course, it may be that certain of these healthy offspring, whose serum does not fix complement in the Wassermann test, harbour *Spirochaeta pallidum* in some non-virulent form, but in the entire absence of clinical and serological evidence of syphilis over long periods of time such a view is hard to accept. Another possibility is that, though the children were infected at birth, the *spirochaeta* have since died out.

It seems that we encounter here one of those clinical problems which can only be solved by the general practitioner making observations over long periods of time and applying scientific methods in his diagnosis.



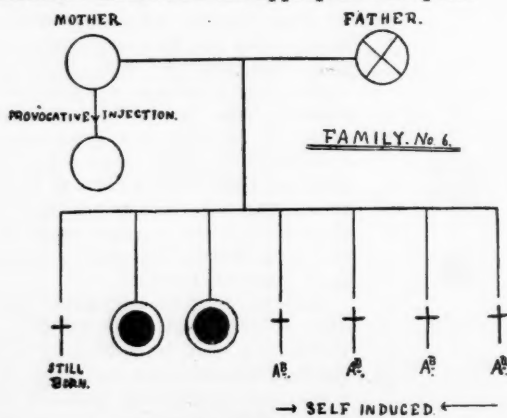
FAMILY No. 5.
GRAPH VI.

Family No. 6.—The mother is a robust, healthy woman, whose blood, even after a provocative injection of salvarsan on two occasions, has not reacted to the Wassermann test. Her two surviving children are syphilitic. The problem awaiting solution in such a case is whether the *spirochetes* have died out or have merely assumed an inert condition and, later in life, may flare up, giving rise to tertiary lesions.

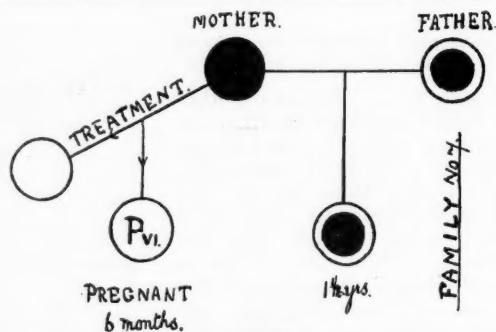
Family No. 7.—This illustrates a happier phase of familial syphilis. The mother has undergone a full course of anti-specific treatment and her blood no longer reacts. She is in the sixth month of pregnancy and will certainly produce a non-syphilitic infant.

Conclusions.

The various protocols indicate that syphilis in the hospital population (especially in the married section) is largely manifesting itself in its tertiary, latent and familial aspects. While venereal clinics are making a progressively more serious effort to deal with acute syphilis, no organized movement is being attempted to combat the great problems of familial and latent syphilis, especially in women. The outstanding need, as we see it, is for clinicians to treat syphilis as a family disease in whatever hospital the disease is diagnosed. Our scheme, which is diagrammatically represented by lantern slides, involves co-operative action on the part of the different metropolitan hospitals in the diagnosis and treatment of syphilitized families. For example, if at the Alfred Hospital, a married male is found to have syphilis, then his wife and family should be clinically examined and have the blood tested. If any are found to be syphilitic, they should be distributed as circumstances demand to special hospitals for treatment; if pregnant, the mother should be treated in an ante-natal obstetric clinic; the children under fourteen years should attend a children's department. Similarly, where children are found to be syphilitic at the Children's Hospital, the father and mother should be examined; also any older children. They could then be distributed to different hospitals for treatment. At the maternity hospitals, the primary consideration would naturally be the mother and new-born infant, but arrangements similar to those adopted by Fowler could be instituted, enabling other members of the family to be investigated and thereafter treated at the appropriate hospital.



GRAPH VII.



GRAPH VIII.

Through the co-operative effort of a few enthusiastic clinicians, this scheme is already working in miniature at the Children's, the Melbourne and the Women's Hospitals in this city. The burden involved, however, is now too great for the comparatively few workers. We present the scheme to this meeting in the hope that the members may see fit to give some such inter-hospital co-operative effort an official status and support.

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FAMILIAL SYPHILIS.¹

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WITH the object of focussing attention more precisely upon the familial aspect of syphilis, a serological survey of 1,000 persons has recently been completed at the Women's Hospital, Melbourne, for the most part pregnant or parturient women and the infants born thereof.

The Incidence of Maternal and Infantile Syphilis.

The serological method of investigation was chosen, as being the only comprehensive single method available for diagnosis, recognizing, as we did, that a large proportion of syphilis in the community is quiescent or latent. Moreover, it affords the most sensitive guide to treatment and the most reliable index of cure. The great bulk of the serology has been performed by the Walter and Eliza Hall Institute of Research, although in a few instances we have made use of tests carried out at the University Bacteriological Laboratory.

As the mother is the keystone of the family, so in any investigation of familial disease it is natural to approach the subject from the maternal side. Our first task, therefore, was to establish the incidence of maternal syphilis. In Table I. are given the figures obtained.

Table I.—Obstetric Cases.

Type of Case.	No. Examined	No. Positive.	Positive %.
Ante-Natal	315	24	7.6
Labour Ward .. .	290	19 (+12=31) ²	10.7
Abortion	100	10	10.0
Total	705	53	7.5

In the labour ward cases we have confirmed and extended the work of Robertson and Piper,⁽¹⁾ who in 1912 investigated 100 consecutive cases at the Melbourne Women's Hospital with a similar 10% positive finding. It is justifiable to assume that for the period intervening between the two observations 10% of the confinement patients at this hospital have been syphilitics. This in itself is a sufficiently sinister fact, but translated in terms of foetal and infantile syphilis its significance is exceedingly grave.

Concerning the number of foetal and infantile deaths due to syphilis we have no original figures to offer. The serum reaction of the mother is not of itself sufficient indication of syphilis in the foetus, so that our 10% finding in abortion cases is of no value in this connexion.

Whitridge Williams⁽²⁾ has shown in an investigation of 4,000 cases that of still-births occurring after

the seventh month and of infantile deaths in the first two weeks after birth, 34% are due to syphilis.

Lamble⁽³⁾ in 1911 correlated the serological and histological evidence in 100 children consecutively examined *post mortem* in the Melbourne Children's Hospital. In these children dying from all causes syphilis was a contributory factor in 62%. Of those dying under one year of age he considered syphilis to be present in practically 100%.

As regards congenital syphilitics who survive, Table II. indicates that 8.8% of babies born in the hospital yield a positive Wassermann reaction. This figure, however, is very much higher than the actual incidence of congenital syphilis, since, as will be explained later, there is a fallacy in regarding these birth reactions as always indicative of syphilis in the child.

Table II.—Neo-Natal Infants.

Type of Mother.	Number of Infants Examined.	Number Yielding Reactions.	Percentage Yielding Reactions.
Wassermann Positive	26	24	92.3
Wassermann Negative	247	0	—
Total	273	24	8.8

In view of the foregoing considerations, it was obvious that we should subject "positive" mothers and infants to intensive anti-syphilitic treatment. This has been done both ante-natally and post-natally. In no case has the course of gestation been

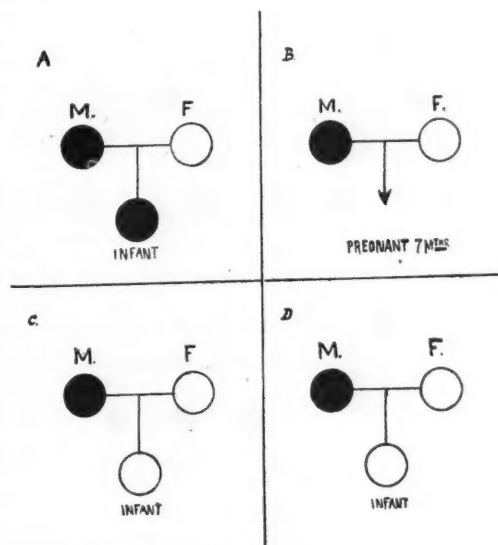


CHART I.

Family A illustrates the birth of a congenital syphilitic to a syphilitic mother, the father being healthy. Family B represents the ante-natal treatment of a syphilitic mother in anticipation of a healthy child. Family C shows the realization of this ideal. Family D is an unusual case, in that a syphilitic mother has given birth to a healthy child without ante-natal treatment. N.B.—The key to this and subsequent charts will be found in Dr. N. H. Fairley's paper, "Studies in Syphilis" (see page 590).

¹ Read at a meeting of the Victorian Branch of the British Medical Association on September 6, 1921.

² These twelve women were admitted from the ante-natal department and are included in the first group.

Table III.—Details of Wassermann Reactions in Infants.

Serial Number of Mother (Serologically Syphilitic).	Treatment for Congenital Syphilis.		Result of Wassermann Tests.				
	Prophylactic, i.e., Ante-Natal.	Curative, i.e., Post-Natal.	At Birth.	At Two Months.	At Three Months.	At Four Months.	At Five Months.
1	Yes	No	Reacted	—	—	No Response	—
2	Yes	No	Reacted	—	—	—	—
3	Yes	No	Reacted	—	No Response	—	—
4	Yes	Yes	Reacted	—	Reacted	—	—
5	Yes	Yes	Reacted	No Response	—	—	—
6	Yes	No	Reacted	—	—	—	—
7	Yes	No	Reacted	—	—	—	—
8	Yes	No	No Response	—	—	—	—
9	No	No	Reacted	—	—	No Response	—
10	No	Yes	Reacted	No Response	—	—	—
11 ¹	No	No	No Response	No Response	No Response	—	No Response
12	No	No	—	No Response	—	—	—
13	No	No	—	—	—	—	No Response ²

unfavourably affected by intensive treatment. We consider that one of the most immediately fruitful fields for ante-natal work lies in the early detection and vigorous treatment of pregnant syphilitics, with the object of both curing the mother and securing a mature and healthy child.

Compared with the catastrophic effects of untreated syphilis in pregnancy, our treated patients have given most gratifying results. Contrast the following: Of 23 untreated women, five had still-born, macerated children, whereas the living infants of at least two others developed virulent congenital syphilis. Of ten women treated in our ante-natal

department, all have had mature, healthy-looking babies. That the majority of these should have yielded a positive Wassermann reaction at birth was at first a keen disappointment. We now realize, however, that the sera of these infants very often spontaneously lose their power to react to the test in a month or so and that post-natal treatment is rarely required. This feature is illustrated in Table III., which gives details of several selected cases of interest. Charts I. and II. are graphic representations of these details and serve to illustrate the type of work we have undertaken.

Collateral Familial Infections.

So much for the incidence and treatment of maternal and infantile syphilis! It next occurred to us that we had a further duty to perform in tracing and treating all collateral familial infections. In this connexion it is of interest to note that practically 80% of the mothers whose serum reacted, were married women (*vide* Table IV.). In reviewing the families of infected persons, we again made use of the routine Wassermann test as the simplest, most comprehensive and readily available method of diagnosis.

Table IV.—Marital State of Syphilitic Mothers.

Groups.	Absolute Number.	Percentage of Total.
Married ..	42	79.2
Single.. ..	2	3.8
Widow ..	2	3.8
Unclassified.	7	13.2
Total ..	53	100.0

Undetected Syphilis.

In Table V. is given the result. It shows, as Dr. Cumpston has remarked, "the reservoir of unde-

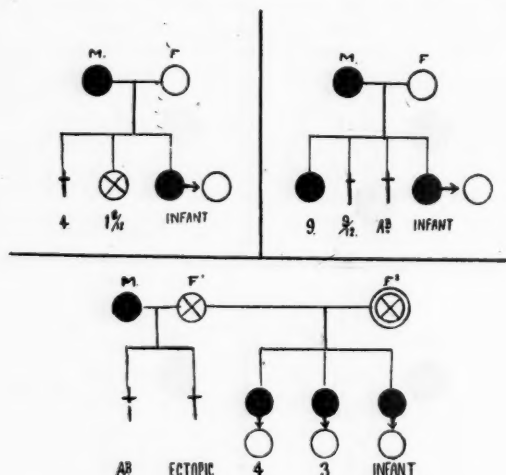


CHART II.

The numerals indicate the ages of the surviving children in years. The arrows indicate conversion of the response to the Wassermann test. In the two upper families this conversion was spontaneous, in the lower it was the result of post-natal treatment of the three children. F¹ = first father. F² = second father.

¹ The serum of this mother gave a "P +++"; the reaction diminished and finally disappeared after four injections of nov-arseno-benzol and mercury.

² There was still no response to the test after a provocative injection of nov-arseno-benzol.

Table V.—Collaterals of Syphilitic Mothers.

Type of Collateral.	No. Examined	Number Yielding Reactions.	Percentage.
Husbands	23	8	35.0
Other Children ..	16	10	62.5
Total	39	18	46.1

tected and uncontrolled syphilis in the families of infected persons."

An astonishing feature has been the large proportion of apparently non-syphilitic husbands of indubitably syphilitic wives. I say astonishing, because all writers upon the subject commence by charging the husband with being the usual culprit in the introduction of familial syphilis. Our findings at once absolve husbands from this unfair and unfounded indictment and forge, moreover, a strong link in the chain of evidence against the theory of conceptional syphilis (*i.e.*, the primary infection by the father of the product of conception, with subsequent secondary infection of the mother).

Table VI.—Ages of Syphilitic Mothers.

Groups.	Absolute Numbers.	Percentage of Total.
Between 20 and 30	39	73.6
Between 30 and 40	10	19.0
Between 40 and 50	4	7.4
Total	53	100.0

Difficulties in Diagnosis and Treatment.

Having outlined in a general way the scope of our work and its results, I shall now proceed to elaborate some of the details of practice by reference to our difficulties and the measures adopted in overcoming them.

Group I..

The first group of difficulties arose from peculiarities in the symptomatology of syphilis. For instance, only a very small proportion of our patients presented recognizable lesions; in other words, the infection was mostly latent.

Furthermore, the difficulty of obtaining a history of infection in women is common knowledge. Some may volunteer a statement, such as "I contracted syphilis from my first husband twenty years ago"; others, again, may have this knowledge, but fail to disclose it. The majority, however, are quite unconscious of their condition (*syphilis ignota*) and are sufferers from cryptogenic infection (*e.g.*, undetected chancre of the *cervix uteri*).

Moreover, the obstetrical history is by no means as valuable an indication of syphilis as is usually taught. A history of repeated abortions may more often mislead than not.

As Charts III. and IV. indicate, abortion may occur with equal facility and frequency in both

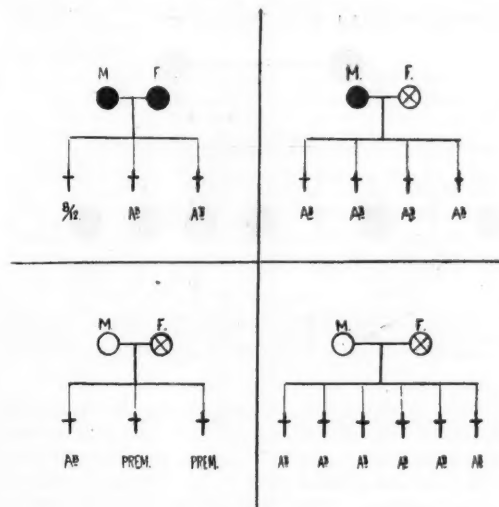


CHART III..

To illustrate the insignificance of abortion as a diagnostic indication of syphilis in the mother.

syphilitic and non-syphilitic women. On the other hand, many syphilitic women are exceedingly fertile and have a succession of syphilitic children, with few, if any, abortions (*vide* Chart V.).

Of much greater significance in the diagnosis of maternal syphilis is the premature birth of a macerated fetus, especially if repeated (*vide* Charts VI. and VII.). That repeated still-births are not necessarily evidence of syphilis, even in the absence of dystocia, toxæmias, etc., is shown by the case illustrated in the lower half of Chart VII..

The above mentioned group of difficulties, *viz.*, latency of infection, unreliability of history, has been met by the routine application of the Wassermann test. We know of no other method for detecting all infections.

Group II..

This group comprises difficulties concerning the reliability of the Wassermann reaction. Obviously

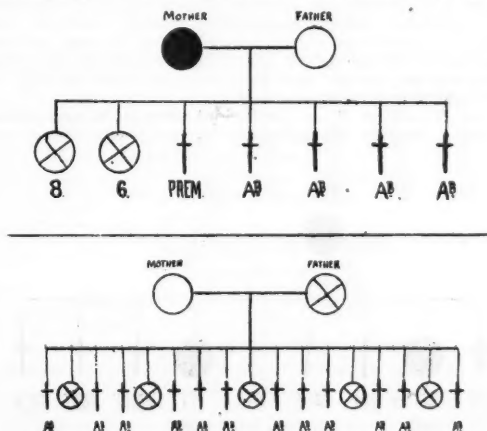


CHART IV..

The same features as illustrated in Chart III.. Repeated abortion occurring in both syphilitic and non-syphilitic women.

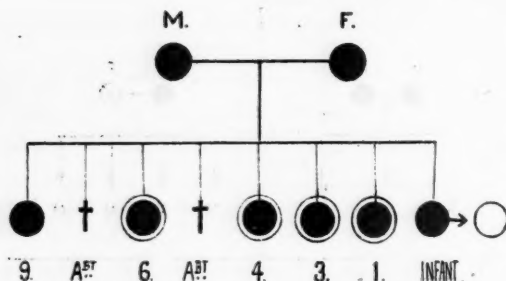


CHART V.

Showing the possible fertility of syphilitic parents. Ante-natal treatment of the mother prior to the advent of the last infant succeeded in producing a healthy child, a result not yet attained by sporadic treatment of the older children.

the whole of our work depended upon the diagnostic integrity of the Wassermann test and yet we were aware that from time to time its validity had been assailed on the ground that it did not agree with the clinical findings. The better the clinical and the better the serological work, the closer will they agree. Sequeira,⁽⁴⁾ dealing with obvious skin lesions, and Fildes, using a standard serological technique, agreed in 99% of cases.

We considered that disagreement between ourselves and the serologist might arise from three possibilities: (i.) Defective serology, (ii.) defective clinical diagnosis, (iii.) defective liaison between the two. As regards the serology, we were aware that a standard quantitative method was being used and were therefore prepared to review a clinical diagnosis had it been in conflict. In reality it never was; on the contrary, unsolicited and unexpected confirmation of the serologist's report was frequently forthcoming. To mention but a few cases:

CASE I.—Mrs. J., seven months pregnant, was one of twelve subjected to a routine Wassermann test on the same day. Her serum was the only one in the batch that yielded a reaction. On further investigation it transpired that she had old chancroidal scars upon the vulva and her husband was found to have a large gummatous ulcer of the leg; his serum yielded a Wassermann reaction.

CASE II.—Baby O. was born prematurely and died within seven hours. It was thought to be syphilitic, as the mother had history of several still-births. The infant's serum, however, did not give a Wassermann reaction. The accuracy of this was subsequently proved by *post mortem* examination of the infant and by the failure of the blood of the mother, father and two other children to react to the Wassermann test.

CASE III.—Mrs. S., a parturient woman whose serum yielded a positive Wassermann reaction. Her infant was

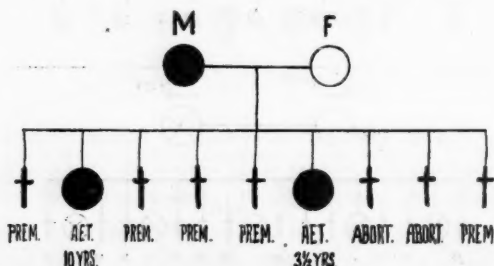


CHART VI.

Showing the catastrophic persistence of still-birth and congenital syphilis, the mother being the only parent affected.

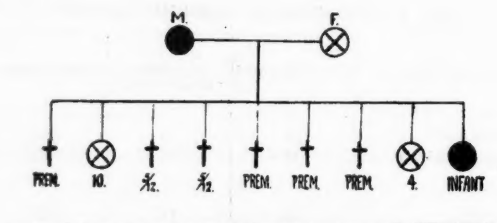


CHART VII.

The upper family illustrates the lethal effect of familial syphilis. The lower family has suffered repeated and inexplicable premature births, neither syphilis, dystocia nor toxæmia being operative.

subsequently still-born; its serum gave a reaction and it had histological evidence of syphilis in the lungs and liver (Dr. Mollison).

So much for the agreement between clinical and serological findings. A serious mistake, however, was very nearly made by reason of the third possibility, *viz.*, defective liaison. In a procedure which involves as many persons as does the Wassermann test, sooner or later a clerical error will creep in. On the occasion to which I refer, specimens of blood were incorrectly labelled and a positive reaction was wrongly attributed to a healthy mother and infant. Fortunately, we had guarded against this source of error by insisting upon re-tests of all reacting sera prior to commencing treatment. As a consequence, the mistake was rectified. In all other cases the re-tests have confirmed the previous findings.

Other critics have affirmed the invalidity of the results of the Wassermann test during pregnancy. We found, however, a discrepancy in their opinions, one author claiming "pseudo-negatives" as a result of pregnancy, another claiming "pseudo-positives." We have been able to show over a large series of observations that pregnancy has no appreciable effect upon the results of the Wassermann test. Illustrative cases:

CASE I.—Mrs. H. contracted a labial chancre six months prior to pregnancy. Her condition was soon recognized and the positive reaction to the Wassermann test disappeared under treatment. The serum remained indifferent to the test during the subsequent pregnancy.

CASE II.—Mrs. McD., a known syphilitic of at least two years' duration, whose serum yielded a Wassermann reaction, became pregnant and was delivered of a still-born child at eight months. The reaction was still obtained at this time, but five months later with perseverance in treatment the serum no longer reacted to the test.

A criticism of the Wassermann test that is valid, is the one already referred to concerning the reaction at birth. A positive reaction at birth is not necessarily an indication of congenital syphilis, although it always indicates syphilis in the mother. The explanation of this phenomenon may be found elsewhere.

Group III..

In this group will be mentioned the technical difficulties encountered in the acquisition of blood samples and in conducting treatment.¹

Ante-cubital venous puncture in adults has proved entirely satisfactory, both for giving nov-arsenobenzenol injections and for obtaining blood samples.

In babies the discrepancy between the amount of blood required by the serologist and that obtained by skin puncture of the heel soon struck us as ludicrous. We had, therefore, to adopt puncture of the longitudinal sinus through the anterior fontanelle. This method has been eminently satisfactory, but can be obviated by obtaining a sample of umbilical cord blood at the confinement. We have always found that the results of tests with the umbilical blood and with the sinus puncture blood run parallel, so that we have no hesitation in recommending the examination of cord blood as a universally applicable routine method.

As regards intravenous injections of nov-arsenobenzenol in infants, we have hesitated to use the sinus, for fear of an occasional aseptic thrombosis. For this purpose, however, the superficial temporal punctures of Findlay are satisfactory in about 50% of infants. If one fails to get into the superficial temporal vein with a No. 1 record needle, there is no option but to inject subcutaneously.

In older children, the jugular venous puncture takes the place of the above, unless the child has suitable ante-cubital veins.

One other therapeutic difficulty has been the administration of mercury intra-muscularly to women. The pain of the injections, lasting several days, has nearly always led to revolt. To overcome this difficulty, we expectantly await the introduction of a preparation of mercury suitable for intravenous administration.

Group IV.—Administrative Difficulties.

Practically no trouble has been encountered in persuading pregnant women to attend regularly for treatment. It is explained that something is wrong constitutionally, which requires treatment, both for her own sake and for that of the child. Perseverance in post-natal treatment, however, is quite another matter and most mothers forsake the clinic with the advent of an apparently healthy baby.

Great difficulties beset the task of tracing and treating collaterals. Husbands will usually suffer a blood sample to be taken, but unless gross lesions are present, will not attend at treatment clinics. As regards other children, the mothers are usually very reluctant to bring them for blood examination and infinitely more so for treatment, if required.

The present *Venereal Diseases Act* does not allow the application of compulsion to recalcitrants in the absence of clinical manifestations, since a positive Wassermann reaction alone is not held to be legal proof of syphilis. The Act, therefore, is only designed to deal with acute syphilis, but, if compulsion is a weapon of any value at all, it is of importance to

apply it forthwith in detecting and treating the great number of chronic and latent syphilitics in the community.

CASE I.—Mrs. S. and infant came to the Alfred Hospital for examination to exclude syphilis. The woman stated that her husband contemplated an action against her for transmission of venereal disease. There was no clinical evidence of syphilis in either mother or child, but the mother's blood gave a strongly positive Wassermann reaction; that of the child failed to react. Could we have sworn that the mother had syphilis?

CASE II.—Mrs. B., a widow, has two children by her late husband, both free from syphilis, clinically and serologically. Mrs. B.'s serum yields a strong positive Wassermann reaction and she is six months pregnant to her paramour, from which she thinks she might have "caught something." Can we apprehend and compel examination in this "gentleman," who has fled to the country?

Various other difficulties in management have arisen to convince us that the general administrative control of syphilis is defective in several important respects. As a result, we would commend to those interested in the prophylaxis of venereal disease the following theses:

1. Compared with the number of clinics for the male the public healthy authority provides insufficient facilities for dealing with the female.

2. Maternity hospitals should endeavour to insure the commencement of ante-natal treatment much earlier than the thirtieth week of pregnancy (our average) and, further, should be prepared to deal with all types of syphilis complicating pregnancy (including the acute infectious stage).

3. Much more could be done by more perfect co-operation of metropolitan hospitals (and private practitioners) to bring under surveillance the contacts of all persons with declared disease, especially the family collaterals.

In conclusion, we should like to express our very great indebtedness to Dr. N. Hamilton Fairley for undertaking the huge burden of our serological work with such meticulous care.

Acknowledgements are also due to our house surgeons, Drs. Dale, Crawcour and Jackson, without whose willing co-operation this investigation could never have been completed.

References.

- ⁽¹⁾ Piper, J. E.: *Australian Medical Journal*, Volume II., New Series, February 22, 1913.
- ⁽²⁾ Williams, Whitridge: *Bulletin of the Johns Hopkins Hospital*, May, 1920.
- ⁽³⁾ Lamble, Gilbert: *Transactions of the Australasian Medical Congress*, 1911, Volume I.
- ⁽⁴⁾ Sequeira: *British Medical Journal*, 1917, I., 3.

*Reports of Cases.**ANATOMICAL ANOMALIES OF THE RIBS.*

By Charles E. Dennis, M.D.,

Radiologist to the Department of Repatriation in Victoria.

THE three sketches attached to these notes illustrate unusual anatomical peculiarities of the anterior ends of ribs. They have been observed in three persons whom I have seen during the past six months in the course of

¹ A series of slides were shown, illustrating methods of venous puncture.

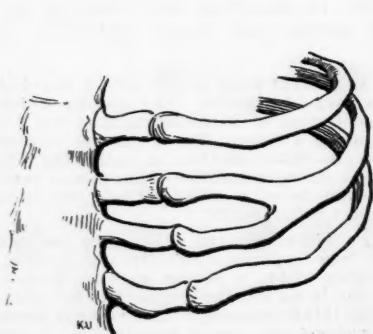


FIGURE I.

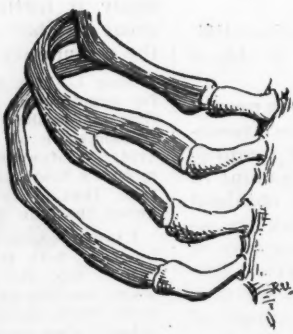


FIGURE II.

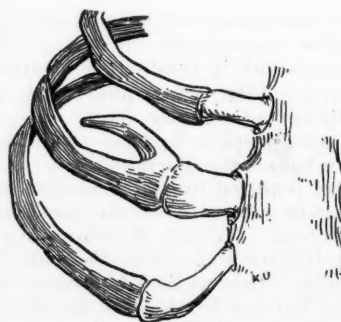


FIGURE III.

chest Röntgenological examination at the Repatriation Department in Melbourne.

Figure I. depicts the third rib dividing into two equal limbs about 7.5 cm. external to the costo-chondral junction. My attention, when viewing the skiagram for the first time, was drawn to the apparent crowding together of the ribs in that side. Closer inspection revealed the cause. Examination of the patient disclosed some asymmetry of the two sides.

Figure II. shows the bifurcation of the fourth rib on the right side. The division takes place less far from the inner end than is the case of the rib illustrated in Figure I. In this case, however, the divided rib forms two perfect limbs, each being provided with a costal cartilage, as in Figure I.

In Figure III. there is a reverse type affecting the fourth rib on the right side. The anterior end of the rib is broadened and the upper limb passes outwards or backwards and ends in a smooth, rounded tip.

I will be interested to learn if any reader of THE MEDICAL JOURNAL OF AUSTRALIA has come across similar conditions. I have not seen a report of one.

Owing to the translucency of the anterior ends of the ribs, these abnormalities do not show well in prints or lantern slides. The drawings have been carried out by Miss K. Ussher, of Sydney.

Reviews.

MEDICINE FOR NURSES.

WRITTEN to promote an intelligent and scientific interest in the work of the wards, Professor Henderson's small manual is, in essence, a text-book of medicine simplified for the use of nurses.¹ But inasmuch as the book contains full directions concerning many details of nursing procedure, as well as theoretical instruction in the groundwork of medicine, its title is something of a misnomer. The author, though confining his subject-matter within a small compass, avoids any crowding of his facts; the book is in no sense an epitome or a "quiz compend" and is eminently readable.

The nurse and her functions, the qualities which perfect her work and the manner of her training are fully discussed. Professor Henderson favours a nursing curriculum so planned that the probationer shall enter the wards after and never before she has acquired some knowledge of anatomy, of physiology and of hygiene. Excellent though the plan may be, it has never found favour in this country.

In Chapters II. to VIII. he deals with the observation and care of patients, explains the uses of the more common

drugs and describes those simple chemical and clinical tests which a competent nurse may be required to perform.

Omitting the rarer affections, the author next summarizes, in their appropriate order, those diseases which present themselves in the medical wards of a large hospital. Pathological and ætiological facts of basic importance are included in each instance and the leading signs and symptoms are adequately sketched. Then follow instructions on nursing, with an account of the accepted treatment and the reasons for that treatment.

Explanatory paragraphs on surface anatomy are inserted wherever necessary. Some of these latter, however, seem unduly technical and full for the purposes of a nurse. No examiner would or at any rate should expect a nurse to map out the borders of the heart and lungs in the painstaking manner laid down for her guidance on pages 128 and 154 respectively.

The author has realized the need for unequivocal statement and simplicity of style. His meaning is always perfectly clear. But the information he conveys is not invariably correct. Professor Henderson in the section on typhus fever states (page 199) that: "This . . . infection appears to be directly transmitted by the emanations from the skin and breath." Over thirty years ago, Murchison suggested a relationship between the louse and typhus fever; over nine years ago Anderson, Goldberger and others placed the matter beyond doubt.

Professor Henderson falls into the not uncommon error of confusing the "case" with the "patient." We read (page 136) that: ". . . One of the peculiar characteristics of a heart case is that he is very restless." Use is made, more than once, of the word "proteid" when the substantive is meant. The book is well printed and the index is sufficiently comprehensive.

AN ENCYCLOPÆDIA OF MEDICINE.

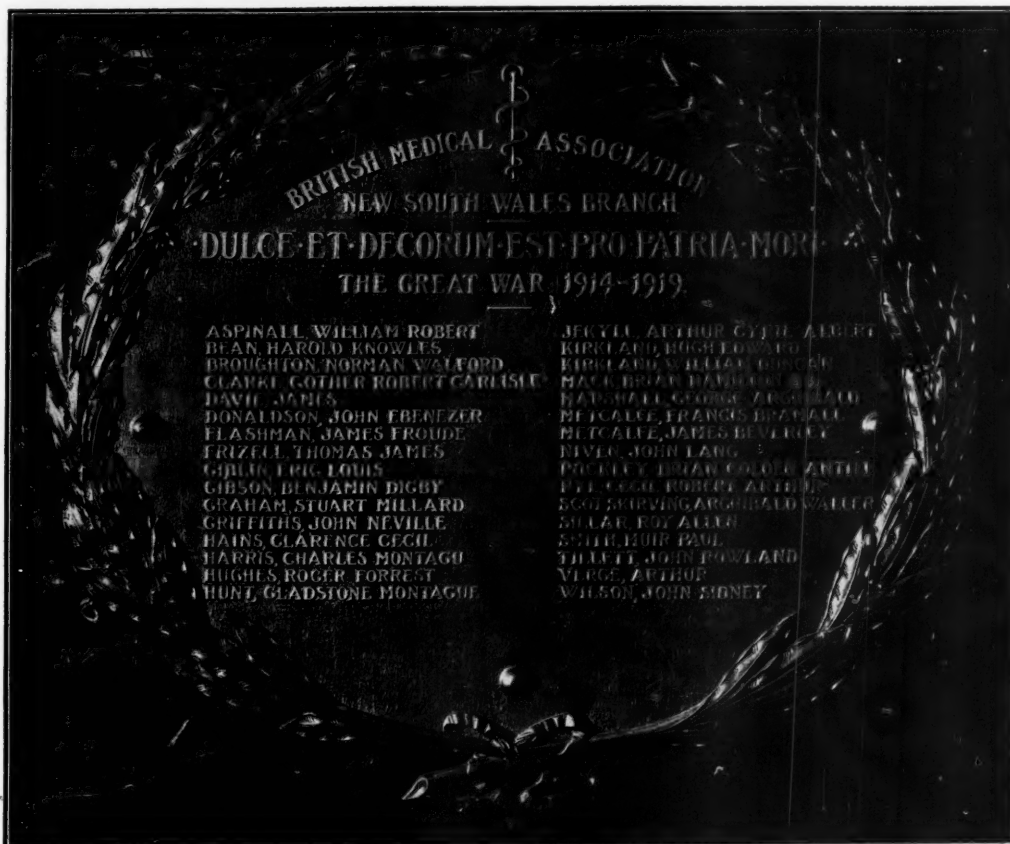
THE seventh volume of the "Encyclopædia Medica" contains articles of great interest. Nearly half the volume is occupied by the subject of labour, which is dealt with by Dr. J. W. Ballantyne, the general editor of the Encyclopædia. Medical diseases of the intestines, surgical diseases of the intestines, invalid feeding, diseases of the iris and ciliary body, jaundice, diseases of the joints and surgical affections of the kidney all provide important and well-written articles. A few questionable statements have been noted. For instance, we find it stated under iodoform that an intravenous injection of a solution of iodoform in ether has been introduced and strongly recommended for the treatment of pulmonary tuberculosis. Isotonic is defined as a term used in physiology in connexion with the measurement of muscular contractions. This is a very inadequate and misleading definition.

¹ "Medicine for Nurses," by John Henderson, M.D., Ch.B., F.R.F.P.S.G.; 1921. London: Edward Arnold; Crown 8vo., pp. 263. Price: 8s. 6d. net.

¹ "Encyclopædia Medica," under the General Editorship of J. W. Ballantyne, M.D., C.M., F.R.C.P.E.; Volume VII., Intestines to Labour; Second Edition, 1921. Edinburgh and London: W. Green & Son, Limited; Sydney: Butterworth & Company (Australia), Limited; Royal 8vo., pp. 611. Price: £1.

Roll of Honour.

IN MEMORY OF THE MEMBERS OF THE MEDICAL PROFESSION IN NEW SOUTH WALES WHO GAVE THEIR LIVES IN THE GREAT WAR, 1914-1919.



Eulogium

Delivered by DR. FOURNESS BARRINGTON, the President of the New South Wales Branch of the British Medical Association on December 6, 1921.

LET us remember with all humility and gratitude, before God and man, those brave colleagues of ours in the Medical Profession of New South Wales, who, in serving their Country in the Great Five Years' War of 1914 to 1919, gave their lives for the freedom of the world.

Their names are perpetuated in the Roll of Honour embossed on this beautiful tablet of bronze erected to their memory, for the unveiling and consecration of which we are to-day assembled.

At the call of their King and Country they left all that was dear to them, endured hardship, faced danger and finally passed out of the sight of man by the path of duty: most of them resplendent with youth, full of vigour and overflowing with hope and happiness.

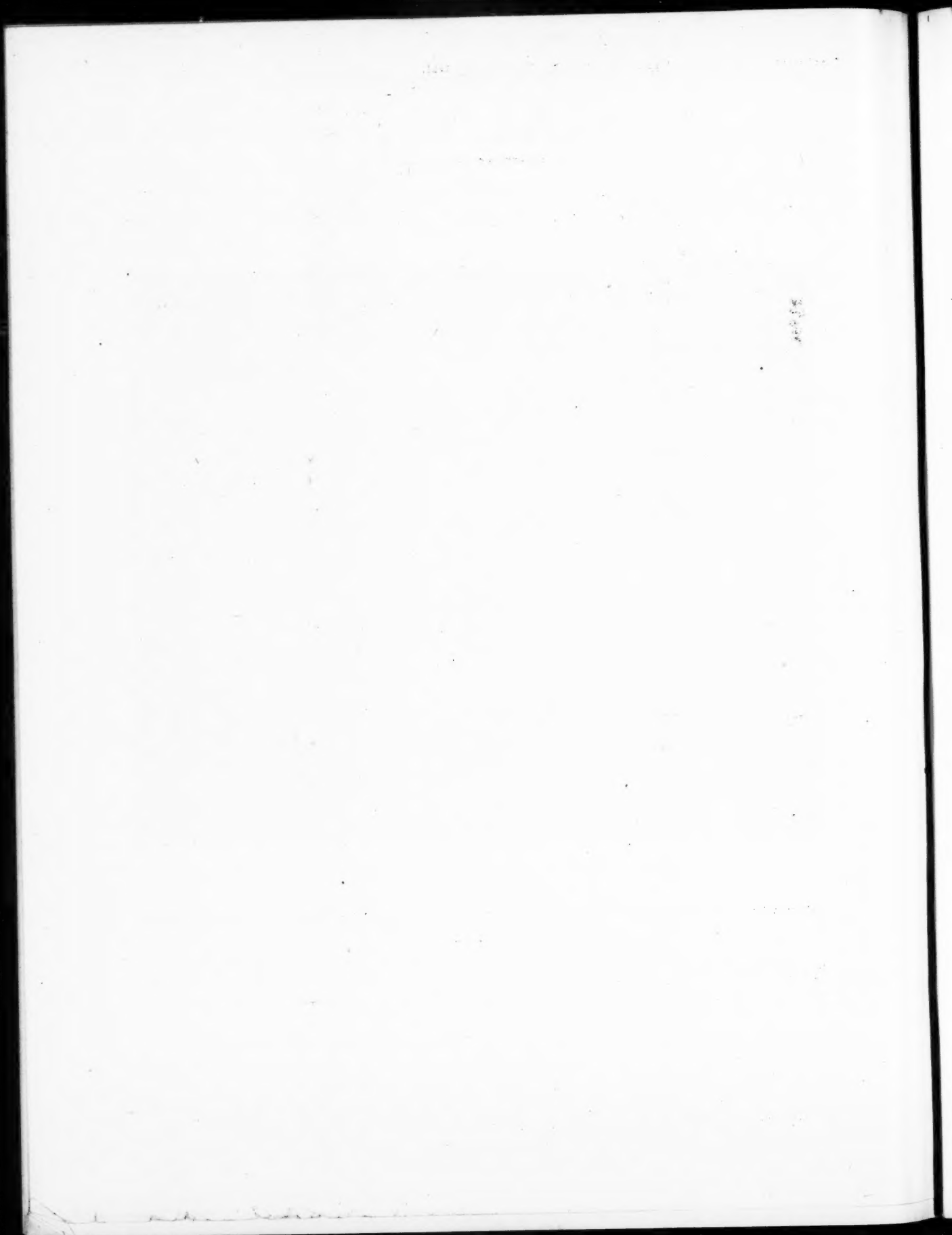
We tender them our homage; and offer them our tribute of reverence and of thankfulness for all that their self-sacrifice helped to achieve.

By their loss we are the poorer: in their noble example we are the richer.

Let us keep their example before us in sad but proud remembrance. Let it be a light to inspire and guide us and those that come after us in the service of humanity.

"Their Glory shall not be blotted out . . . and their name liveth to all generations."

GOD SAVE OUR KING!



The Medical Journal of Australia

SATURDAY, DECEMBER 24, 1921.

The Plague Conference.

RATS infected with plague bacilli have been driven out of the cities and towns in Queensland and are now spread over at least one thousand miles of the coastal belt. At first this unwise expedient may cause a respite and may delay the full development of the first stage of the epidemic. After a time these infected rodents will find their way back to the more densely populated areas. When they return, they will carry large numbers of fleas, ready to spread the infection to man. At present it is impossible to reach the hunted rats in their secure cover in the sugar fields and in the bush. Modern epidemiologists have condemned the centrifugal method of attaching rats during an outbreak of plague.

The public does not appear to have had its attention drawn to the findings of the Plague Conference of November 16, 1921. Some of the resolutions adopted at this conference are very significant. Some comfort may be gathered from them. It may be of use to refer to a few of the resolutions in this place.

In regard to the human patient, an appeal is made to medical practitioners and to the State health authorities. When plague is suspected, the former should notify the fact without loss of time and the latter should take as much precaution as if the infection were proven to be plague until the diagnosis is determined by bacteriological examination. It is rumoured that in many cases this obligation has not been carried into effect and that there have been more infections in human beings than has been admitted in the published records. Whether this rumour is founded on fact or not, it is highly significant that the conference has given both medical practitioners and the State Health Departments a clear lead concerning the proper attitude to be adopted in cases of suspected infection.

The next point of importance is that it is stated that the risk of infection from persons suffering from bubonic or septicæmic plague is negligible. The patients may be treated in the isolation wards of general hospitals without danger to the community. The usual outcry when a hospital for infective diseases is established in a relatively crowded centre is not based on epidemiological facts. In the case of plague, with reasonable care and proper attention to nursing details, the patient is not a source of danger.

The conference obviously regarded the rat flea as the most important element in the complex of infection. The use of sentinel guinea-pigs to trap fleas from rats and especially from dead rats is a valuable method of determining the presence of infection. That fleas may convey the infection of plague for several weeks without contact with a rat has been demonstrated on many occasions. It has been determined that the public is to be excluded from premises on which infected rats have been found until the place has been proven to be flea-free. The conference did not indicate the evidence that may be regarded as reliable of the absence of fleas. The guinea-pig will, no doubt, collect the majority of fleas seeking a host under ordinary conditions, but it has yet to be shown that every flea will be taken up in this manner. Moreover, fleas will not leave a living rat taking shelter for a guinea-pig. The task of destroying the plague infection resolves itself into that of the simultaneous destruction of rodents and fleas. If one rat or one flea can escape, the work is productive only of temporary good. There is one efficient practical agent on which reliance can be placed that every rat and every flea will be killed. This is hydrocyanic acid. The conference recommended that hydrocyanic acid gas should be used "where practicable." It is unnecessary to point out the rapidity of the action of this poison. A sufficient concentration of the vapour can be secured under almost all conditions to clean up any building. It is stated that hydrocyanic acid vapour is being used with signal success for the destruction of fruit blight at Mildura in the open air. A tent is placed over the tree; the vapour is generated within the tent and the result is eminently satisfactory. There is no need for elaborate

apparatus. A few trained men place bowls of acid in each room to be fumigated. Suspended over this bowl is a small bag or sack containing some potassium cyanide crystals. The string suspending this bag or sack is released from outside the room, with the result that the bag or sack falls into the acid. With a little skill the preparations for fumigation can be made, even in the largest warehouse or in a half open shed, in an hour or two. There is no necessity to seal up all the openings. Closure of windows and doors suffices, while open spaces can be covered loosely with tarpaulin. When all the bowls and bags of crystals are in place, a reliable worker starts at the top floor and rapidly releases the strings one after another. He has ample time to descend to the next floor before the vapour can reach him. In the course of a very short time the whole building will be permeated with hydrocyanic-acid vapour and then all rats and their fleas are dead. The vapour diffuses so rapidly that within a few hours it is quite safe for an active man to open up the premises without exposing himself to risk of poisoning. A few hours later the building is safe for human use.

The next piece of useful advice is that immediate attention should be given to effective rat-proofing of wharves and buildings in the vicinity of wharves. This must be done if Australia is to be freed from plague epidemics in the future. The last resolution of the conference to which we would draw attention, may be paraphrased as follows: Do not pin your faith on vaccines or serum, but see that not a single infected rat or flea escapes your toil! The public must be taught that plague is impossible in a community in the absence of rats and their fleas and that the safest way of attacking an epidemic is to destroy both. Hunting and driving the rat from place to place is worse than useless.

THE NAUSEA AND VOMITING OF PREGNANCY.

MORNING sickness is more or less generally recognized as the commonest disorder of the early stages of pregnancy. A certain degree of nausea and vomiting is looked upon as an inseparable accompaniment of the pregnant state. Not until these symptoms become aggravated and show pernicious effects, are they considered to have passed beyond the physiological border line into the domain of pathology. It is possible that an adjustment of these opinions will be necessary in the near future. Dr. Victor

John Harding, Professor of Pathological Chemistry at the University of Toronto, Canada, has recently made a strong plea for the consideration of the vomiting of utero-gestation as a preventible embarrassment of the expectant mother.¹ He believes that he has solved the riddle of morning sickness and that he holds in his hand the secret of successful treatment. He proposes to explain the cause of these well-known symptoms of early pregnancy on the hypothesis of a deficiency of glycogen in the maternal liver. It is suggested that the glycogen content of the mother's liver becomes insufficient to meet the requirements of both fetus and mother. In the first few months of pregnancy the fertilized ovum bears the relationship of a parasite to the maternal host. The metamorphosis from the parasitic to a symbiotic mode of life is made possible by the development of a placenta, which may be regarded as a defensive mechanism installed by the mother to control the claims for nutrition made by the fetus on her own limited supply. One of the functions of the placenta is to store glycogen for the needs of the child. The mother's liver is the source whence this glycogen is obtained. When the placental formation is complete, a condition of equilibrium is established between the mother's liver and the placenta and the excessive drain on the former's limited supply is lessened. The placenta maintains this function till the fetal liver can act as a storehouse for itself. It is emphasized that morning vomiting has an onset which corresponds to the period of rapid placental development, and a decline which corresponds to the assertion by the placenta of its right to act as a buffer between the fetus and the mother.

But in certain instances the nausea and vomiting fail to subside. Up to the third or even the fourth month neither patient nor obstetrician views morning sickness as anything more than an inconvenient manifestation of a physiological condition. When, however, the condition passes almost insensibly into the continuous rejection of food, with supervening starvation, the name "pernicious vomiting" or "hyperemesis" is applied. These very terms suggest the innocuousness or physiological significance of the milder forms. Professor Harding assumes that persistence of the vomiting of pregnancy is due to a continued insufficiency of hepatic glycogen. The equilibrium between the placental and hepatic glycogen fails to become established and the depletion of the mother's supply continues. Fatty infiltration of the liver ensues, ketones appear in the urine, vomiting and nausea become more pronounced and starvation threatens. The remedy lies in the intelligent provision of a dietary rich in carbo-hydrate. If carbo-hydrate be administered to the mother in a satisfactory manner, the vomiting will cease, the fatty infiltration of the liver will vanish, the acidosis will come to an end and there will be a happy return to the normal pregnant condition.

Such, in brief, is Dr. Harding's thesis. The evidence advanced is argumentative rather than demonstrative. He relies on an appeal to reasonable surmise and to pathological findings in allied condi-

¹ *The Lancet*, August 13, 1921.

tions rather than on the figures which make medicine a science. For example, he makes a comparison with acute yellow atrophy of the liver, which has many features in common with *hyperemesis gravidarum*. In acute yellow atrophy necrosis of the central portions of the lobules and fatty degeneration of the peripheral portions occur. Again, V. H. Mottram has shown that in certain animals fatty infiltration of the liver occurs after a short period of starvation and that a similar condition is present in many pregnant animals who are ill-nourished. Dorman noticed that nausea in pregnancy was most marked after a prolonged fast and the matutinal periodicity of mild vomiting supports this view. Titus, Hofmann and Givens also emphasized the relationship between starvation and nausea. It is known that in starvation the glycogen content of the liver becomes slowly depleted and, as the glycogen diminishes, a fatty infiltration of the organ occurs. H. C. Davis and G. H. Whipple showed only a few years ago that small areas of fatty degeneration in the liver become normal after feeding with carbo-hydrate. From a consideration of these facts Professor Harding evolved his theory of the cause of nausea and vomiting during uterogestation. Apparently he attempted to make no estimations of the amount either of sugar or of the products of incomplete fat metabolism in the blood. No quantitative estimations are given and no definite pathological evidence. He assures us, however, that the logical sequence of his theory—the administration of a diet rich in carbo-hydrate to sufferers from morning sickness or the more exaggerated condition—has results which are successful in the extreme.

Intestinal intoxication has been credited by many workers with the cause of hyperemesis. Others have regarded the condition as a neurosis appearing in women whose nervous equilibrium is upset by the strain of the pregnant state. Professor Harding does not hazard a denial of either of these causes, but he regards them as secondary and not as primary ætiological factors. Intestinal intoxication may cause vomiting, but it is curable with a purge. The vomiting associated with carbo-hydrate starvation is uninfluenced by purgation. The neurotic factor has a similar position. The normal condition of a pregnant woman is characterized by a highly sensitive sympathetic nervous system. Excitation of the sympathetic nervous system is known to produce a hyperglycæmia at the expense of the glycogen store in the liver. Hence the neurotic factor aids and abets the primary cause.

The treatment laid down by the author is based on these views. Glucose is administered orally, *per rectum* or interstitially, so as to restore and maintain the glycogen content in the maternal liver. Attention is directed to the bowels and active purgation practised. The neurosis is controlled by rest in bed, isolation from sympathetic relatives and the moderate use of sedatives. An attempt is made to alleviate the dehydration of the tissues which follows the prolonged vomiting of fluids, by the administration of water.

Professor Harding claims that his hypothesis is simple, that it makes the fewest possible assump-

tions and that it is consistent with the greatest number of known facts. His views are certainly advanced with clearness and will carry conviction to many. One virtue which they possess, is the abrogation of the prevalent assumption of a specialized toxæmia of pregnancy which has been blamed without any experimental evidence for many of the complications of pregnancy.

THE SUGAR CONTENT OF THE CEREBRO-SPINAL FLUID IN DISEASE.

LAST year an attempt was made by certain French authors, notably Netter, Pierre Marie, Mestrezat, Laporte, Rouzard and Dopter, to attach a diagnostic significance to the sugar content of the cerebro-spinal fluid in relation to *encephalitis lethargica*. It was considered that a normal sugar content might be taken as about fifty milligrammes to each hundred cubic centimetres of fluid. In lethargic encephalitis the concentration of sugar rose to as much as 100 milligrammes and it was thought that this high figure suggested a diagnosis of encephalitis and permitted a differentiation of that disease from acute or tuberculous meningitis in which the glucose content was low. The high sugar findings, however, were not constant. In 18% of the cases recorded in the literature the figure did not exceed 55 milligrammes.

To determine the accuracy of these views, Dr. R. Cope, of the Department of Biochemistry at the University of Liverpool, made a series of investigations and his results have recently been published.¹ He examined the fluids of 95 patients, eleven of whom suffered from *encephalitis lethargica*. The method adopted was that of Folin and Wu. The author found that the sugar content of the cerebro-spinal fluid was no higher in lethargic encephalitis than in other conditions, with the exception of meningitis. The findings in cases of uræmia, pneumonia, hydrocephalus, *tuberculous meningitis*, syphilitic meningitis, general paralysis of the insane, mania, epileptic insanity, imbecility, *dementia præcox*, delusional insanity, disseminated sclerosis and in apparent health were, assuming the French standard of normality as correct, invariably high and in no way different to the figures obtained in cases of *encephalitis lethargica*. The results in thirteen cases of tuberculous meningitis were in contrast very low, the common figure being well below 30 milligrammes. In one case of pneumococcal meningitis the content was 19 milligrammes and in a case of meningococcal meningitis it was as low as eight milligrammes.

Dr. Cooper concludes that the French tendency to regard a high sugar content as pathognomonic of lethargic encephalitis is not justified. He is also of opinion that the French normal figure is far too low and agrees with the findings of von Jaksch and Hopkins, who believe that it averages 70 milligrammes per cubic centimetre. He confirms the belief that a low sugar content is strongly in favour of the diagnosis of an infective meningitis.

¹ *The Quarterly Journal of Medicine*, October, 1921.

Abstracts from Current Medical Literature.

DERMATOLOGY.

(271) "Creeping Disease."

HARUKICHI TAMURA (*British Journal of Dermatology and Syphilis*, March and April, 1921) has reviewed all the reported cases of "creeping disease," of which about fifty have occurred in England, America, Russia, France, Germany and Japan. The three parasites which have been held responsible for the disease up to the present are *Gastrophilus*, *Gnathostoma* and *Hypoderma vobis*. The lesions caused by these animalculæ have several points in common. They are either erythematous, papular or vesicular or show combinations of these characteristics. The line is tortuous and frequently curled on itself and it may advance as much as 10 cm. in the twenty-four hours. The eruption is usually accompanied by sensations varying from slight to actual pain, depending on the depth to which the larva migrates. The disease is easily cured, either by removal of the parasite or by killing it *in situ* with applications of iodine or cataphoresis with perchloride of mercury. The length of the organism varies from 1 mm. in the case of *Gastrophilus* to 9 mm. in the case of *Gnathostoma*.

(272) Hæmorrhagic Purpura Following Treatment with Neo-Salvarsan.

T. ALYN DAVIS (*British Journal of Dermatology and Syphilis*, July, 1921) reports a case of hæmorrhagic purpura following the injection of nov-arseno-benzol into a patient suffering from latent syphilis. A course of seven weekly intravenous injections of nov-arseno-benzol and intramuscular injections of mercury was administered over a period of nine weeks with one week's interval without treatment. In the fourth and seventh weeks this course was followed by a month's rest, during which potassium iodide alone was given. The second course commenced in the thirteenth week and consisted of an injection of 0.75 gramme of nov-arseno-benzol and of an intramuscular injection of 0.06 gramme of mercury. Twelve hours after the injection the soles of both feet became swollen, the temperature rose to 38.9° C., a generalized rash appeared on the body and there were rigors and articular pains. A week later dark purple petechiæ covered the skin, some of which persisted for ten days. Recovery was uneventful.

(273) Lichenoid Trichophytide.

CHARLES MALLORY WILLIAMS (*Archives of Dermatology and Syphilology*, September, 1921) reports four instances of a generalized eruption occurring in cases of *Trichophyton profunda* infections. Several continental authors have also reported similar eruptions, among them being Bruno Bloch and C. Rasch, who observed cases in Copenhagen. Cultures have

shown that the fungus causing the kerion may vary, the essential point being that there must be deep mycotic inflammation. The author states that the commonest form of rash consists of small, lichenoid papules, which may occur singly or in groups. Other types have been noted in which vesicles, pustules and scarlatiniform rashes predominated. The exanthem fades as the deep mycotic infection clears, the organism acquiring an immunity, by virtue of which the infection is thrown off both from the original site and from the secondary foci.

(274) Eczema in Childhood.

ERWIN PULAY (*Urologic and Cutaneous Review*, October, 1921) maintains that the nature of eczema in children and adults is essentially the same and that the disease requires the same therapeutic measures in persons of all ages, with a few exceptions. He discusses the views of several noted dermatologists, amongst them Unna and Hebra. He maintains that before an eczema appears, the patient must have an eczematous predisposition or *status eczematosis*, caused by predisposing or provocative causes of internal or external origin. He pays special attention to internal therapy of the intestines, kidneys and blood and of the place of origin, which receives the brunt of the attack. He claims to have observed cases of generalized eczema treated successfully on these lines. Locally he relies on protective measures as far as possible, believing that specific remedies do not exist.

(275) Poikiloderma Atrophicans Vasculare.

JOHN LANE (*Archives of Dermatology and Syphilology*, November, 1921) reports a case of *poikiloderma atrophicans vasculare*. Only twelve cases of this disease have been reported in dermatological literature. In a brief résumé of the reported cases the author states that the main features of the disease are a guttate atrophy and a pigmentation of the skin. Any part of the derma may become implicated. Histologically there is atrophy of the superficial layers of the skin, infiltration of the blood vessels and pigmentation in the affected areas, accompanied by loss of the elastic and fatty tissue. The ætiology is obscure. Amongst the theories advanced are those which refer the causation of the disease to anomalies of the endocrine system, to toxæmias and to embryonic defects.

(276) Streptococcal Dermatoses.

ERNEST D. CHIPMAN (*Archives of Dermatology and Syphilology*, October, 1921) maintains that the streptococcus plays a very important rôle in the production of various dermatoses, either from direct inoculation of the sound skin or from the subsequent contamination of an antecedent affection. He lays emphasis on the special characteristics which supervene in the presence of the streptococcus. These include erosions, serous oozing and yellow fissured crusts. He takes *impetigo*

contagiosa as a typical example of a streptococcal dermatosis, which tends to extend peripherally, while a staphylococcal infection remains circumscribed. Amongst the various dermatoses which he maintains are due to the streptococcus, the most important are *impetigo contagiosa*, *impetiginization*, *intertrigo*, *ecthyma* and infectious eczematoid dermatitis.

(277) Darier's Disease in the Infant.

JOHN BORGHOFF (*Archives of Dermatology and Syphilology*, November, 1921) reports a case of Darier's disease in an infant. The appearance of the disease was preceded by the development of a peritonsillar abscess. The eruption spread slowly, involving the back, scalp, chest, abdomen and anal region. The lesions for the most part consisted of discrete papules which were yellowish-brown in colour, except in the axillary and inguinal regions, where ulceration due to moisture and friction was present. Parakeratosis, associated with thickening of the granular layer and *corps ronds*, was present at the follicular openings. The intermediate areas showed only minor changes. The patches cleared up temporarily under X-ray therapy.

(278) Urticaria Pigmentosa in the Adult.

WALLACE BEATTY (*British Journal of Dermatology and Syphilis*, April, 1921) describes a case of *urticaria pigmentosa* in an adult male. The patient gave a history of the appearance of an eruption which gradually spread over the trunk and extremities. The lesions were discrete macules, yellowish-brown in colour and not altered by pressure. Some, however, were red and slightly raised. Subjective sensations were absent, except when the patient took a bath, when there appeared slight urticarial elevations, accompanied by itching. Microscopical examination showed closely-set mast cells in the corium.

(279) The Treatment of Larva Migrans.

LLOYD KETRON (*Archives of Dermatology and Syphilology*, September, 1921) reports a case of *larva migrans* which had resisted all the usual methods of treatment. Finally he froze an area about the size of a shilling solid with carbon dioxide snow around the advancing end of the burrow. This treatment proved successful.

RADIOLOGY.

(280) Pneumo-Peritoneum.

L. R. SANTE (*Journal of Radiology*, June, 1921) sounds a note of warning against the indiscriminate use of pneumo-peritoneum as a method of examination. He bases his opinion on a series of eighty cases. Like every new method, this one has been received with rather more than its share of enthusiasm wherever used. It should only be looked upon as an additional aid to present methods of investiga-

tion. After ordinary methods have failed to give the desired information or in cases in which their use would be of no avail, this method may be attempted. Pneumo-peritoneum does not displace a barium meal examination, nor does it render visible a mass in the pyloric region of the stomach. It is of little value in renal work or in the examination of the lumbar spine. While the risk of the procedure is small, the introduction of a needle into the abdominal cavity is not without risk and the patient's discomfort is sometimes considerable. The method is particularly useful in determining the origin of palpable masses, especially of retro-peritoneal tumours. Peritoneal adhesions are demonstrable by this procedure. The patient is given an aperient on the day preceding examination and a light breakfast is allowed. The bladder should be catheterized before the operation is begun. The author prefers the left lower quadrant as the safest point for puncture. No measuring devices are necessary and when the abdomen is rounded and tympanitic, the inflation is stopped. The author prefers air and oxygen to carbon dioxide, as the latter absorbs too rapidly.

(281) Radiation Physics and Therapy.

HENRY SCHMITZ (*American Journal of Roentgenology*, June, 1921) writes on the relationship of physics to radiation therapy. The electrometer, which gives a direct reading of the γ radiations of radium, and the ionization chamber of Friedrick, of one cubic centimetre volume, have made it possible to measure the exact amount of radiation reaching any part of a body lesion. With these instruments it is possible to express radiation values in electrostatic units and the normal erythema dose is noted as consisting of 160 to 170 units, while the dose necessary to produce destruction and necrosis of the skin is 300 units ("death skin dose"). A dosage of 33 units will produce amenorrhoea. The death dosage of various tissues differs. The author refers to the necessity of radiating all parts of a cancerous growth equally; for this purpose combinations of radium and X-rays are indicated. He predicts the replacement of the present empirical dosage by more accurately measured dosage, which will include also a measurement of the secondary radiations from the tissues which the radiations traverse. He advises further research along these lines and also emphasizes the need for further knowledge of the histological changes in the tissues subjected to radiations. In this way may be solved the debated question as to the supposed sensitiveness of cancer cells to radiations. The paper includes a number of intricate measurement tables which should be useful for reference.

(282) Granite Dust Inhalation.

D. C. JARVIS (*American Journal of Roentgenology*, May, 1921) has carried out a series of investigations at one of the large granite centres on the effects

of dust inhalation among granite workers. Three hundred and eighty-six men have so far been examined. The death register shows that 86% of granite workers die of tuberculosis. The author uses a low spark-gap of 8.75 cm. with 30 milliamperes of current and his exposures vary from one and a half to five seconds. The cases were classified into nine groups: granite pneumokoniosis (three stages), granite fibroid pneumokoniosis (three stages) and granite tubercular pneumokoniosis (three stages). The author found that the workers ceased early to suffer from the irritation due to the inhalation and the pharyngeal mucosa became very insensitive, thus allowing free ingress of the dust without producing cough. The absence of cough was a noticeable feature in all these cases. In general it was noted that mouth breathers showed less change than nose breathers. Of ten nationalities concerned in the investigation, it was found that Irish workers were more severely affected than any other race, while the Italian was but little affected. The onset of the affection is slow and it takes from 20 to 25 years before the condition of pneumokoniosis is well established. The author did not find it possible to distinguish between tuberculosis and pneumokoniosis.

(283) Habitus.

L. SETH HIRSCH (*Archives of Radiology and Electrotherapy*, June, 1921) contributes a paper on the radiographic appearances of the heart in relation to habitus. The author's experience confirms the view that there is no absolute normal standard for the organs of the human body. Different types of body conformation are associated with corresponding differences of the internal viscera. For general purposes the classification of most use is that which includes asthenic, hyposthenic, sthenic and hypersthenic types. The asthenic habitus presents certain thoracic characteristics. The thorax is long and shallow, with narrow acute subcostal angles and absent ensiform cartilage. The pulmonary fields are relatively broad above and the diaphragm slopes sharply. The transverse pelvic diameter exceeds the transverse thoracic diameter at the base of the thorax. In the hyposthenic habitus the thorax is only moderately long, but somewhat broader than in the asthenic individual. In the sthenic type the thorax is shorter and wider and the subcostal angle is about 90°. The pulmonary fields are wide at the base and narrow at the apex. The diaphragm is evenly convex and the pelvic and thoracic diameters are equal. The hypersthenic type is an accentuation of the sthenic type. In this type the pulmonary fields scarcely project above the clavicles and the transverse diameter of the pelvis is less than that of the thorax.

(284) Ossification and Development.

C. R. BARDEEN (*Journal of Radiology*, June, 1921) contributes a paper on the relation of ossification to phys-

iological development. As a child grows in height and weight, the proportions of the body change, owing largely to the relatively slow growth of the head and the rapid growth of the extremities. During adolescence structural differentiation is more rapid than increase in size, while later in life slow structural changes continue. The changes in size and structure which characterize infancy, childhood, adolescence, maturity and old age, demarcate periods of physiological age rather than chronological age. By a study of numbers of persons, it is possible to decide on a normal physiological development for a given chronological age. The use of X-rays offers a simple and direct method of determining skeletal development, since it is possible in this way to study the extent of ossification in as many bones as desired in any given case. The author gives several lists of times of development of various bones and the date of average appearance of the centres of ossification.

(285) Protection of Radiographer and Patient.

E. PFAHLER (*American Journal of Roentgenology*, May, 1921) describes a simple new device for increasing the protection of the patient and operator during radiological activities. The increase in the power of the apparatus has led to a progressive increase in the dangers. These dangers consist of high tension shocks and of stray radiations. Loose wires should be abolished and the patient should always be cautioned against movement during the exposure. Stray radiations are emitted through the openings of the lead shields and the operator may be given a large dosage in a short time from this source. To cut out this radiation, the author uses a large piece of lead-impregnated rubber, which is folded over each end of the tube and fastened over the back of the shield, so as to enclose the tube ends completely. A second square of rubber is used immediately over the terminals as an extra protection.

(286) Leather-Bottle Stomach.

L. T. LE WARD (*American Journal of Roentgenology*, April, 1921) discusses the condition known as leather-bottle stomach or *linitis plastica*. It is very difficult to distinguish radiographically between diffuse infiltrating scirrhus cancer, syphilitic infiltration and fibromatosis of the stomach. The term "leather-bottle" applies to these three gastric conditions and the Röntgen picture shows a small stomach with an irregular, deformed appearance of the curvatures and absence of peristalsis. The pylorus apparently gapes widely and the food passes in an uninterrupted stream through the canal, the stomach emptying in a few minutes. There is often some delay in the terminal oesophagus, due to fibrous involvement of the cardiac orifice. In reporting on these cases, it is better to report the radiological appearances and not attempt to distinguish between scirrhus cancer, syphilis or fibromatosis.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held in the Pathological Lecture Theatre of the Melbourne Hospital on September 6, 1921, Mr. BASIL KILVINGTON, the President, in the chair.

Syphilis.

Dr. N. HAMILTON FAIRLEY, O.B.E., read a paper entitled "Studies in Syphilis" (see page 587).

Dr. ROBERT FOWLER, O.B.E., read a paper entitled "Familial Syphilis" (see page 599).

Dr. WM. DISMORE UPJOHN, O.B.E., in opening the discussion, expressed his keen appreciation of the value of the laborious investigations of Drs. Fairley and Fowler in a field of the first importance. He did not intend to speak in detail, but in general could say that in his experience in the out-patients departments of the Melbourne and Children's Hospitals the results of the Wassermann test as carried out by the ice-box technique corresponded very closely with the clinical findings. As a result of the subsequent closer investigation of a few cases which at first appeared as clinically syphilitic, but in which no Wassermann reaction was obtained, he had come to place great reliance on the Wassermann test.

He had been very much interested in a family in which, although the children were distinctly affected with inherited syphilis, the mother's blood persistently failed to react to the Wassermann test, in spite of provocative injections of salvarsan. Inquiry showed that this woman contracted her infection from her former husband, by whom she had had an abortion. He had made similar observations in other families.

An important question was that of the health of these children as they approached adolescence. It was not uncommon to note that the power of the serum to react to the Wassermann test would gradually disappear, a transition which was frequently completed by the time the child reached fourteen years of age. To what extent the altered character of the serological response was due to treatment and how much it was a matter of age were questions difficult of determination.

In conclusion, Dr. Upjohn said that he had been much impressed by the accuracy of the serological results obtained by the quantitative method and expressed a wish that it would be extended and established as a standard technique.

Dr. R. R. STAWELL said that, although the work of Dr. Fairley on the Wassermann reaction was of general interest and appeal, those members of the staff of the Melbourne Hospital who during the last twelve months had experienced the enormous benefit and help it afforded, would have followed Dr. Fairley's paper with an intensified appreciation. From week to week as the number of cases increased and evidence accumulated, they felt that they could place more and more reliance on the Wassermann test, as obtained by the very recent methods.

Formerly, although the Wassermann test was of the greatest assistance in diagnosis in the majority of cases, there was a large minority in which its results were disappointing. Indeed, these results were frequently so haphazard and confusing that many expressed doubt concerning the reliability of the test. He had indicated his own attitude in his address to the Section of Medicine at the last Congress and it was briefly that in a large number of cases the Wassermann reaction provided useful confirmation of diagnosis and was the best guide to the results of treatment of syphilis; at the same time, the test not infrequently failed in cases in which the clinical evidence of syphilis was so indubitable that there was no alternative but to ignore it.

Such discrepancies were inseparable from the difficulties attendant upon the carrying out of such a complex reaction and the variabilities in the disease. The Medical Research Council in England had recognized the difficulties and had endeavoured to minimize them by laying down a standardized technique for the Wassermann test. Last

year, the British Ministry of Health instituted a careful review of the same problem and emphasized the inherent difficulties of the biological test. The result of these efforts was a great advance and whereas, as he had indicated, the earlier results were often disappointing, he could definitely state that during Dr. Fairley's year of work he had not received a single report of the absence of the power to react on the part of the serum of patients recognized clinically as syphilitic.

Dr. Stawell referred to a recent letter in THE MEDICAL JOURNAL OF AUSTRALIA by Dr. Shearman, in which the discordant results following a variable technique were emphasized and expressed his conviction that a modern standardized technique should be adopted throughout the State. He formally moved:

That the Victorian Branch of the British Medical Association request the Commission of Health in the State of Victoria to prescribe as a minimum standard for the Wassermann reaction a modern quantitative technique, as advocated by the Medical Research Council in England and as recently carried out at the Walter and Eliza Hall Institute in Melbourne.

Dr. JULIAN SMITH seconded the motion and expressed his admiration for the energy and enterprise displayed by Dr. Fairley in his very careful work. At the beginning he (Dr. Smith) was not aware that the work was in progress until he learned from a conversation with Dr. Stawell that efforts were being made at the Walter and Eliza Hall Institute to collect a series of observations on the clinical value of the Wassermann test, based on a quantitative technique. He at once availed himself of the opportunity thus provided and sent along many samples of blood, with a view to watching the results very closely.

His former estimate of the value of the Wassermann test was that it was very frequently helpful, very frequently conformed to the clinical features in the individual case, but sometimes did not, in which event he continued to treat the patient as syphilitic.

The improved results attendant upon the quantitative technique convinced him that as clinicians they were now leaning on something very much more accurate than the old test.

Dr. R. J. BULL tendered his congratulations to Dr. Fairley and added some remarks on complement fixation work generally.

He reminded the meeting that the pioneer in Australia of serological work of this character was Dr. Konrad Hiller. Some years ago it had been his very great pleasure to afford Dr. Hiller space in the Bacteriological Laboratory of the University of Melbourne, in order that he might initiate studies on the Wassermann reaction. Dr. Hiller brought to the work that care in technique and interpretation of results which was so essential to the successful performance of the test. Quite early he had discarded the use of an aqueous extract of a syphilitic liver as antigen.

Since those early days there had been many advances in the technique of the Wassermann test as conducted at the University Laboratory and in the course of twelve years there had been carried out 75,000 Wassermann tests. Some thousands of these had been correlated with the clinical histories of the patients, but through pressure of work there remained a very large number yet to be classified.

Dr. Bull referred to the importance that had been attached to the use of quantitative methods and in subscribing to this view, indicated that the Wassermann tests in the University Laboratory were based on a quantitative technique. A definite known amount of complement was employed and the results were graded in a manner which connoted the amount of complement fixed.

Their nomenclature at the University differed from that adopted by Dr. Fairley, but it was designed to express very much the same results.

Dr. Bull had centred his energies on the syphilitic antigen, having been influenced thereto by the considerations that the test depended upon lipoidal relations and displayed a certain degree of specificity. The syphilitic antigen had been carefully controlled by that of cholesterinized heart extract and, as a rule, the results corresponded very closely. But occasionally it would happen that, whereas

the results in the majority of the instances were in agreement, one or two in a long series of tests would give entirely different readings with the two antigens. It was with a view to working out the underlying factors responsible for this disparity in results and to secure thereby an interesting series of cases for further study that he suggested to Drs. Patterson and Fairley some months ago that they should carry out a series of 100 tests simultaneously at the two departments. That had already been done, but through stress of work the results had not yet been compared.

The extraordinary value of the test clinically was beyond question, but personally he was less inclined than some serologists to place a too rigid interpretation on the results of the Wassermann test. The greatest degree of cooperation on the part of clinician and serologist was essential.

It was to be remembered that five colloids from at least four species of animals were introduced into the test. While they attempted to standardize according to certain well-known looked-for properties in the interacting colloids, properties about which they knew little or nothing were apt to influence the results. Degrees of reaction took place in malaria and other non-syphilitic conditions.

Dr. Bull said that in issuing reports from the University Laboratory he designated as a "strong positive" reaction one in which the maximum amount of complement was fixed; this was the equivalent of the term "P +++" employed by Dr. Fairley.

He (Dr. Bull) had recently had an opportunity of discussing questions relative to the Wassermann reaction with Dr. C. J. Martin. In the course of the conversation Dr. Martin concurred in an opinion that the only way to get comparable results was to send all specimens to the same laboratory. It seemed to him that this was especially applicable when a series of blood samples was taken from the same patient in order to gauge the effect of treatment.

With reference to the significance of feeble and partial reactions, Dr. Bull stated that he did not regard such results as indicative of syphilis and on this point he was in agreement with Dr. Fairley, who expressed the same type of reaction as "P +." Of course, owing to the rise and fall of the Wassermann reaction curve, some of these feeble reactions occurred in definite cases of syphilis.

In conclusion, he might say that any increase or elaboration of complement fixation work at the University could only be compassed by new financial arrangements. In the last twelve months the number of Wassermann tests carried out in the University Laboratory exceeded 13,000 and at the present time a subsidy of £1,000 *per annum* was expected to cover all the Wassermann tests, all examinations for the detection of the *Spirocheta pallida* and all the gonococcal work required under the *Venereal Diseases Act*. This amount was quite inadequate.

Dr. KONRAD HILLER said that during the course of Dr. Fairley's work with the ice-box method the Wassermann tests of his Melbourne Hospital Clinic had been performed at the Walter and Eliza Hall Institute and in the same period he had sent the blood of his private patients to the University Laboratory.

In both series he received reports which were quite consistent with his clinical expectations. He considered that as yet they had not had sufficient experience of the ice-box method to conclude that it held any striking superiority over the ordinary Harrison technique, but it was very important that a close comparison should be made of the results attendant upon the two procedures.

Dr. Fairley had stated that a failure to react to the Wassermann test did not necessarily mean cure and had advocated a series of tests over a period of two years. He (Dr. Hiller) was disposed to go further and to say that no patient should ever be told he was free from syphilis, but that he should be recommended to have treatment at intervals for the rest of his life.

He had found the evening's demonstration very instructive and hoped that the investigations would be continued.

Dr. N. HAMILTON FAIRLEY, O.B.E., concurred in the statement of Dr. Bull that it was quite impossible to carry out the more elaborate technique of the Wassermann test on a large scale with restricted finances.

The work he had presented covered over 4,000 cases, in which a special effort was made to correlate the clinical and serological findings; the results entirely corroborated

the tremendous literature of the Medical Research Committee on this question which had appeared during the last five years. In other words, a definite advance was represented in the use of reinforced antigens and a quantitative and multi-tube method. These criteria must be accepted.

Many comparisons had been made between the various antigens and there was now no doubt regarding the increased sensitiveness of the test when reinforced antigens were employed.

Speaking personally, he got much more out of a quantitative triple tube method and indeed would not care to issue results on a single tube technique.

As a result of five years' work he was convinced that accurate quantitative work in the performance of the Wassermann test must remain and had greatly enhanced its value.

At this stage Dr. Stawell's motion was put to the meeting and carried without dissent.¹

Dr. J. H. L. CUMPTON drew attention to the fact that the evidence submitted by the papers which had been read, must inevitably involve careful consideration of two important questions: (i.) A certificate of freedom from syphilis before marriage. (ii.) The provision of compulsory powers for the examination of other members of the family of which one member was found to be infected.

He also emphasized the fact that the information placed before the meeting showed that a great extension of laboratory facilities available for medical men in practice was essential and that the proper comprehension of the importance of exact technique and of inquiring into the history of other family members when a case of syphilis was diagnosed was necessary. He concluded by urging the necessity for the British Medical Association definitely declaring its policy in regard to latent and familial syphilis.

SIR JAMES BARRETT, K.B.E., C.B., C.M.G., said that he desired to remind the large audience present that Dr. Fairley would shortly be departing from Melbourne, as he had accepted a professorial appointment in Bombay. They were proud of the honour conferred on the Melbourne University and at the same time were sorry to lose Dr. Fairley.

Sir James expressed the hope that Dr. Fairley would some day return to Australia, possibly to occupy a Chair of Pathology in one of the universities.

The demonstration given by Dr. Fairley and Dr. Fowler marked another milestone in the progress of the campaign against venereal diseases. The first milestone was that laid by Dr. Hiller and Dr. Ham in 1910, when the Government of Victoria instituted its now famous inquiry into the prevalence and prevention of these diseases. As they were aware, one of the results of that inquiry was the establishment of the British Royal Commission. The conclusions then reached from the evidence furnished had been confirmed that evening, but with much greater detail and precision of method, and he was afraid that there was nothing to indicate that these diseases had in any way diminished in frequency.

Sir James Barrett agreed entirely with Dr. Cumpston that the time had come when the profession would have to decide on the policy it would adopt; it could not allow matters to drift. He went further, however, than Dr. Cumpston, for he did not see how such diseases could be checked or properly treated without the complete cooperation of the public.

Complaints had been made in the course of the evening of the lack of funds to do the work of diagnosis and treatment in the proper way, but how could the Government be expected to provide funds on the scale desired, unless both Government and public fully understood the nature of the problem, its immensities and its difficulties. Who was there to give this instruction, except the medical profession, who should act for this purpose in a corporate way.

Dr. E. ROBERTSON said that he would be loath to recommend to the Minister any prescribed technique for the Wassermann test. It appeared to him that it would be

¹ The Council of the Victorian Branch has ruled that, as due notice of motion had not been given, these resolutions are informative and not mandatory.

putting hobbles on scientific progress to regulate definitely methods that were not uniformly recognized as perfect. If a regulation were made it would require to be definite. He recognized the necessity for quantitative records, but if these meant that three or four tubes must be used for each test, he feared that such procedure was not reasonably practicable. From the administrative point of view, it was necessary to know whether the reaction was positive or not; the degree of positiveness was more a clinical than an administrative matter.

As he had said, he did not think it desirable to legislate on these laboratory methods, but he considered it very necessary that the few who were engaged in this work, should adopt uniform methods, keep in touch with one another and discuss from time to time the difficulties that were sure to occur.

Adverting to the words of the motion, Dr. Robertson pointed out that the Commission of Health was not concerned with the administration of the *Venereal Diseases Act*. This Act was administered directly by the Minister. As much of the work under the Act was confidential, it could not be carried out by a Commission which must work in the open, with consequent leaks of secret matters.

Dr. Robertson gave the following information concerning the amount of infection notified between July 1, 1917, and June 30, 1921:

Reported Cases.

District.	No. of Infections.
Metropolitan	26,932
Ballaarat	87
Bendigo	129
Geelong	222
Rest of State	927
Whole State	28,297

Sex.	Number.
Males	24,234
Females	4,063

Patients Treated at Departmental Clinic.

Disease.	Males.	Females.	Totals.
Gonorrhoea	4,996	251	5,247
Chancroid	434	7	441
Syphilis	2,254	282	2,536
Totals	7,684	540	8,224

Total attendances for treatment: 250,277.

Ages of Patients.

Males: The ages varied between the first year of life and over 60. The age incidence was greatest between 20 and 25, the number of patients being 2,182. Between 25 and 30 there were 1,874 patients. There were 518 under 20 and 46 over 60.

Females: The ages varied between 16 and 50. Between 20 and 25 there were 169 and under 10 years 106. Between 25 and 30 there were 86 patients.

Particulars of 6,716 Male Patients at Time of Acquiring the Disease.

Drinking	1,868
Sober	4,848
Source of Infection—	
Amateur	3,357
Professional	3,359
Marital State—	
Single	5,231
Married	1,354
Widower	131

Particulars of 442 Female Patients.

Alcoholic Habits: 52 persons addicted to drink, 390 of sober habits.

Social Status: 336 classed as "amateurs" and 106 as prostitutes.

Marital State: Single, 280; married, 159; widow, 3.

DR. R. H. MORRISON moved:

That with a view to investigating and treating the whole family when one member is found to be suffering from syphilis, the staffs of the Alfred, Childrens, Eye and Ear, Melbourne, Queen Victoria, St. Vincent's and Women's Hospitals and officers of the Lunacy Department should be asked to appoint one representative each to a committee to consider and recommend to the staffs of the hospitals a scheme for the cooperation of the various hospitals in the treatment of the infected syphilitic families among the hospital class of patients.

The motion was seconded by Dr. F. BLOIS LAWTON and carried unanimously.

ROLL OF HONOUR.

AN extraordinary meeting of the New South Wales Branch of the British Medical Association was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on December 6, 1921, for the purpose of unveiling the Roll of Honour erected in the Library of the Branch to commemorate the names of those members of the medical profession who gave their lives in the service of their country during the war.

DR. FOURNESS BARRINGTON, the President, performed the ceremony. A large number of members did homage to their dead colleagues by standing in silence while the President in solemn and impressive tones delivered the eulogium which is reproduced beneath the picture of the Roll of Honour in the Supplement.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

PATRICK, JAMES KING, M.D., 1913, Ch.B., 1901, B.Sc. (Public Health), (Univ. Glasgow), D.P.H., R.C.P.S. (Ireland), 1910, 23, Elizabeth Street, Paddington.
LYNCH, FREDERICK MINIAN, M.B., Ch.M., 1921 (Univ. Sydney), Urana.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

PETTENGAR, CHARLES FIRTH, M.B., Ch.M., 1921 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.
FRANKLIN, SAMUEL DE VERE, M.B., Ch.M., 1921 (Univ. Sydney), Dixon Street, Parramatta.

Public Health.

THE PLAGUE CONFERENCE.

ON November 14, 1921, a conference of health authorities was held for the purpose of discussing bubonic plague. The proposal to hold such a conference had been determined at the Premiers' conference. The Prime Minister issued invitations to various individuals and as a result the following met in Sydney on November 14 and following days: Dr. J. H. L. CUMSTON, Director-General of Health, and Dr. J. S. C. ELKINGTON, Chief Quarantine Officer, North-Eastern Division, representing the Commonwealth Government; Dr. W. G. ARMSTRONG, Director-General of Public Health of New South Wales, representing his department; Dr. E. ROBERTSON, Chief Health Officer of Victoria, representing his department; Dr. J. I. MOORE, Commissioner of Health of Queensland, representing his department; Dr. W. RAMSAY SMITH, Permanent Head of the Department of Public Health of South Australia, representing his department; Dr. C. SHEARMAN, Pathologist and Bacteriologist of the Health Department of Western Australia, representing the Health Department of Western

Australia; Dr. E. S. MORRIS, Director of Public Health of Tasmania, representing his department; Dr. FOURNESS BARRINGTON and Dr. C. B. BLACKBURN, O.B.E., representing the New South Wales Branch of the British Medical Association; and Dr. A. GRAHAM BUTLER, D.S.O., representing the Queensland Branch of the British Medical Association.

The Director-General of Health for the Commonwealth was elected chairman.

The chairman referred to the responsibilities of the Commonwealth Government as a signatory to the International Sanitary Convention of Paris of 1912 and quoted the Articles of the Convention which had reference to the outbreak of plague.

The following resolutions were adopted after full discussion:

Collaboration of State Authorities with Commonwealth Government.

That the several State health authorities undertake to supply to the Commonwealth Government all information necessary to enable the latter Government to comply fully with the requirements of the International Sanitary Convention.

Infected Foci.

(a) Cases.

1. That where in the opinion of a medical practitioner any case is one of plague, the State Department of Public Health should provisionally regard such case as one of plague, even in the absence of initial bacteriological confirmation, and should admit such case after consultation to an observation ward for exhaustive examination.

2. That the use of animal inoculation should always be resorted to in case of doubt in the diagnosis of any human case.

3. That suspicious as well as declared cases should be reported by practitioners.

4. That the risk of infection from bubonic or septicæmic cases of human plague is negligible and that such cases may safely be treated in isolation wards of a general or an infectious diseases hospital.

5. That it is not essential for plague cases to be treated in isolation hospitals at a distance from population.

(b) Contacts.

1. That contacts of plague cases suffering from bubonic or septicæmic plague should be allowed freedom of movement under surveillance for a period of seven days. Contacts of pneumonic plague cases should be isolated for seven days after last contact with the case.

2. That private houses do not require to be quarantined or isolated where it is reasonable to suppose that the infected person has acquired the infection elsewhere. Isolation would more reasonably be applied to the place where the disease was contracted.

(c) Determination of Extent of Focus.

1. That test-trapping for rats along lines approximately radial within an area of 200 yards distance around an infected focus should be resorted to as soon as a focus is known to be infected.

That the area enclosed by a line drawn between the points at which infected rats are so trapped should be at once dealt with by intensive trapping and rodent eradication.

2. That the use of guinea-pigs on the "sentinel" system as indicators of plague-flea infection in any premises is approved as effective.

3. That the examination of fleas from rodents be carried out as a routine measure in both infected and apparently uninfected districts and States, the specific purpose of such examination being the determination of species with reference to the distribution and relative numbers of *Xenopsylla cheopis* and the presence or otherwise of infected fleas and their species.

4. That access to the whole or such portion of the premises on which infected rats have been found and which are deemed to be infective, be denied to employees and public, except under control of the health authorities, until the place is proved flea-free.

(d) Isolation of Focus.

That in special circumstances and when the conditions indicate such action the enclosure of any localized infected area with a rat-proof fencing is to be regarded as a valuable preliminary measure for the purpose of preventing the escape of rats which may be incubating the disease or which may carry infected fleas.

(e) Intensive Rodent Destruction.

1. That the following draft regulations are approved by the Conference as representing the minimum standards for regulations relating to the control of plague, which should be adopted and enforced by all States in view of the plague situation as it is to-day in Australia.

The Conference is of opinion that in any State in which the existing legal powers are inadequate for the enforcement of such regulations, the necessary legal powers should without delay be obtained from Parliament.

(i.) No owner or occupier shall place, throw, leave or suffer to remain on his premises any waste food, refuse, garbage, waste matter or thing which would have a tendency to encourage or attract rats to visit or frequent premises or to form or afford harbourage or shelter to rats.

(ii.) Whenever upon any premises any litter, hay, straw, packing material, manure, building material, produce, timber, bags, tins, old iron, paper, packing cases or similar material is kept or stored in such a way as to afford or form shelter or harbourage for rats, it shall be removed or so stacked, stored, arranged or protected as to no longer afford or form shelter or harbourage for rats.

(iii.) No waste food, garbage, edible trade waste, horse-feed or cow-feed, food intended for birds or other animals or similar material shall be kept or allowed to remain on any premises unless it is contained in rat-proof receptacles or compartments which are kept effectively covered or closed against access by rats.

(iv.) Every opening from or into any covered drain or sewer within the curtilage of any premises and every opening from or into any pipe, covered conduit or covered channel (whether or not used for drainage) which affords or is likely to afford access, shelter or harbourage for rats, shall be so trapped or otherwise protected as to prevent effectively the ingress or egress of rats.

(v.) Every disused covered drain, disused covered sewer, disused pipe, disused covered conduit or disused covered channel within the curtilage of any premises which affords or is likely to afford access, harbourage or shelter for rats, shall, upon notice to that effect being given by the

to the owner or occupier of the premises, be taken up, repaired, blocked or otherwise so dealt with in the manner specified in such notice as to effectively prevent the access, harbourage or shelter of rats therein.

(vi.) Whenever in any building the floors, skirtings, wainscots, walls, partitions, ceilings or like internal fittings or any of these are so constructed or are in such a condition as to permit the access, shelter or harbouring of rats in, under or about such building, the said floors, skirtings, wainscots, walls, partitions, ceilings or like internal fittings shall be so removed, refitted, reconstructed, altered or repaired as to prevent as far as practicable the access, shelter or harbouring of rats in, under or about such buildings.

(vii.) Every retaining wall, embankment, structure, improvement or work of any kind or any formation, whether natural or artificial, within the curtilage of any premises, which affords or provides or is likely to afford or provide the means of access, harbourage or shelter for rats, shall, in accordance with an inspector's order, be removed or so reconstructed or repaired or altered as to prevent the access, harbourage or shelter of rats.

(viii.) Every hotel, restaurant, butcher's shop, small-goods shop, baker's shop, grocer's shop, fruit shop, fish shop, oyster saloon, produce store, hide store, flour mill, stable and slaughter-house shall be so protected, altered or refitted in accordance with inspector's orders as to effectively prevent rats from gaining access to or harbouring in, under or about the building or buildings thereof. All holes or openings in the external walls of such buildings which are of such a nature as to permit the entry of rats, shall be blocked with cement or protected with stout wire netting or metal in such a manner as to effectively prevent the

entry of rats. All supplies or collections of water to which rats may have access in or on such premises, shall be so protected as to effectively prevent such access.

(ix.) For every hotel, restaurant, butcher's shop, small-goods shop, baker's shop, grocer's shop, fruit shop, fish shop, oyster saloon, produce store, hide store, flour mill, stable and slaughter-house there shall be provided at least two rat traps of a pattern approved by the

or as many more as may be required from time to time by the owner or occupier or his agent or servant and all rats found therein shall be killed and their carcasses forthwith disposed of so as not to cause a nuisance and the trap or traps re-set and re-baited by the said owner or occupier or his agent or servant.

(x.) In addition to the foregoing every owner and occupier shall use all reasonable means by blocking access ways, destroying harbourage, protecting foodstuffs, poisoning, trapping, the use of rat-killing dogs, cats or other animals and otherwise to keep the premises occupied by him free from rats and to prevent and discourage the access to or harbouring of rats in, on or about such premises.

(xi.) All public and private docks and wharves, including all sheds and other buildings thereon, shall be so protected as to prevent rats from gaining entrance to such docks or wharves, or sheds or buildings at any state of the tide from vessels moored or anchored alongside of such docks or wharves or from other sources and all goods, products, wares and merchandise liable to attract or to become infested or infected with rats on any dock or wharf, shall be so kept or stored as to prevent rats from gaining access to or coming into contact therewith.

Every dock or wharf shall be provided with not less than traps of a pattern approved by an authorized officer and as many more as may from time to time be required by any authorized officer. Every such trap shall be baited with fresh and suitable bait at least twice a week and shall be kept set. Every such trap shall be inspected at least once daily by the owner or occupier or his agent or servant and all rats found therein shall be killed and their carcasses shall be forthwith disposed of in such manner as the

may from time to time require and the trap or traps re-set and re-baited by the said owner or occupier or his agent or servant.

(xii.) The presence of rat holes, rat runs, fresh rat dung or other evidence of rat infestation upon any premises, dock, wharf, land or place shall be taken as evidence that these regulations have not been complied with and shall be held to constitute a breach of these regulations.

It shall be the duty of every owner and occupier to comply with the foregoing regulations at his own expense and to continue such compliance during the continuance of such regulation. If any owner or occupier makes a default in compliance with any of the provisions of the foregoing regulations the owner or occupier may, by himself or any officer or person authorized by him, whether specifically or generally to such end, enter upon the premises at any time and cause the regulations to be complied with in all respects. Any expenses incurred by the owner or occupier in so doing may be recovered by him by summary proceedings before a magistrate and in addition such owner or occupier shall be liable to a penalty not exceeding £50.

(Where blanks appear the name of the appropriate authority should be inserted.)

2. That only trained certificated inspectors or others with similar qualifications should be entrusted with responsibility of disinfection of infected premises and that hydrocyanic acid gas be used where practicable. In other cases pulicides of proven value should be used.

3. That dogs should be used in preference to cats for destruction of rodents.

4. That the Conference recommends the payment of a bonus to the public as a valuable auxiliary measure for securing the destruction of rats.

(f) Flea Destruction.

1. That, in view of the importance of infected fleas in the transmission of plague to human beings, the destruction of fleas be an essential part of all measures taken in respect of infected premises.

2. That the use by sanitary authorities of guinea-pigs as traps for fleas in infected premises, in addition to their use as indicators of active plague infection, is approved as effective.

Protection of Other Centres.

(a) Wharves, Foreshores and Vicinity.

1. That special and immediate attention be given by the responsible authorities in each State to the eradication of rats and the effective rat-proofing of wharves and buildings in the immediate vicinity of wharves.

2. That an effective rat-catching staff should be kept constantly employed on the wharves and foreshores of all ports.

Shipping and Land Communications.

That medical inspection in uninfected States of passengers on vessels from an infected State is not necessary and that a declaration covering the name, destination and addresses of all passengers will be sufficient.

Preventive Inoculation.

That, though sufficient evidence is not available to enable the Conference to speak decisively as to the value of prophylactic inoculation with vaccine against plague, the evidence available favours its use as an optional measure in those specially exposed to infection. The essential feature of an anti-plague campaign should be the extermination of rodents and not immunization by means of vaccines.

Use of Plague Serum.

The Conference considers that curative serum is of sufficient value to be used in cases of plague and it is important that it should be administered at an early stage in the disease and in sufficiently large doses.

The Conference considers that a record of the effect of the use of serum should be kept according to a uniform clinical record scheme, to be drafted by the Commonwealth Department of Health.

The Medical Profession.

The cooperation which is very essential between the health authorities and the general practitioner, may be specially directed (i.) on the part of the profession to insuring the prompt and willing carrying out of responsibilities laid down by the Health Department and (ii.) on the part of the Health Department to insuring the early diagnosis and treatment of cases of plague, the making of adequate provision for cases and for dealing with suspects.

General.

1. That the Conference views with apprehension the existing situation in Queensland with respect to human plague and rat plague and records its opinion that the epidemiological history of plague in Australia points to an extreme likelihood of a serious outbreak amongst human beings in the early months of the ensuing year or years.

This Conference considers that, although it is not too late to introduce measures calculated to reduce the total mortality of such an outbreak, which measures are indicated broadly in the foregoing resolutions, it is essential that these recommendations be adopted with the minimum of delay; and also considers that the beneficial results to be expected are likely to be directly proportioned to the promptness and efficiency with which they are put into effective operation by the health authorities concerned.

2. That the Conference is of opinion that with respect to plague administration the central authority should have sufficient powers of supersession of any local authority when it appears that the latter is in the opinion of the central authority failing to do its duty.

3. That it is essential to have laboratory facilities, mobile or fixed, available for use at points where plague is liable to occur or has occurred.

4. That the development of an enlightened and active public opinion with reference to the part played by rats and rat fleas in the spread of plague is a factor of outstanding importance to the success of measures for the prevention and eradication of plague. To this end the Conference urges that deliberate and coordinated effort should be made by all sanitary authorities in Australia to enlist public effort and public opinion in support of the measures required.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on December 5, 1921.

The degree of Master of Surgery (Ch.M.) was conferred upon Mr. J. E. WEBB, M.B., *in absentia*.

The following appointments were made:

Mr. I. G. MACKAY, B.A., as Secretary to the Extension Board, *vice* PROFESSOR TODD, resigned.

PROFESSOR TODD to be a member of the University Extension Board, in lieu of the REVEREND A. HARPER, resigned.

Mr. G. G. WADDY, M.B., Ch.M., as Lecturer in Ophthalmology.

Mr. G. DALE, B.Ec., as Assistant Clerk of Examinations.

Mr. N. C. EARL, B.Sc. (Adelaide), Ph.D. (St. Andrews), Lecturer in Organic Chemistry.

An additional tutor in medicine at the Sydney Hospital.

Invitations were received for representation of the University at the Seventh Centenary of the University of Padua and also at Bologna at the Sixth Centenary of the death of Dante.

PROFESSOR SIR EDGEWORTH DAVID and ACTING PROFESSOR LAUNCELOT HARRISON were appointed University representatives to meet representatives of the Australian Museum and Royal Society to advise the British Museum regarding a collection of Australian fauna.

On the motion of Dr. D'ARCY it was decided that the constitution of the University Women's Union be amended in connexion with the office of President.

The Professorial Board, after considering the question of securing uniformity in the giving of information to unsuccessful candidates at University examinations, has recommended to heads of departments that, without divulging the percentage of marks gained by unsuccessful candidates at University examinations, they should give such candidates any possible information that may be of service to them.

The Professorial Board and the following Faculties reported that the undermentioned had been elected Fellows of the Senate for a period of two years:

Professorial Board: PROFESSOR W. H. WARREN, D.Sc., M.Inst.C.E., LL.D.

Faculty of Arts: PROFESSOR E. R. HOLME, M.A.

Faculty of Law: PROFESSOR THE HONOURABLE J. B. PEDEN, B.A., LL.B.

Faculty of Medicine: PROFESSOR A. E. MILLS, M.B., Ch.M.

Faculty of Science: PROFESSOR SIR T. W. EDGEWORTH DAVID, K.B.E., C.M.G., B.A., B.Sc., F.R.S.

The following recommendations of the sub-committee appointed by the Committee of the Professorial Board and representatives of the Undergraduates' Association regarding a commemoration festival in 1922, were adopted:

1. That a commemoration festival be held on May 18 and 19, 1922.

2. That the proceedings of the first day be mainly of an official character, to include official commemoration of benefactors, conferring of degrees and such other function as the Senate may approve, together with an athletic sports programme on the University Oval at 2 p.m.

3. That the programme for the second day be as follows: 12.30 p.m.: Profession to leave the Domain, arriving at the University at 1.45 p.m., where it will parade and disperse. 2 p.m.: Undergraduates' fête in the Quadrangle, with presentation of "blues" and songs. Afternoon: Students' commemoration ceremony in the Great Hall. Lectures, demonstrations and displays in the departments. Dancing in the Union Hall and such other buildings as may be available. Refreshment at the Union, Fisher Refectory and Manning House. Evening: Illumination of buildings and grounds. Concerts and picture shows in the Quadrangle. Dancing as in the afternoon.

4. That a souvenir programme should be prepared, which shall include the whole proceedings of the festival.

5. That a feature should be made of decorations, especially by electric light at night.

6. That a joint committee of the Professorial Board and Undergraduates' Association be appointed to consider details of organization and finance.

7. That while active cooperation should exist throughout between the Senate and the Undergraduates' Association, the Senate should be concerned more, particularly with the organization of the programme for the first day and the Undergraduates' Association with that for the second day.

On the recommendation of the Faculty of Medicine it was decided that (1) the examination in *Materia Medica* and Therapeutics for the present junior fourth year students be held in December, 1922, instead of August, 1922; (2) the students be informed (a) that all who fail to pass in two out of the three subjects of the Fourth Degree Examination by December, 1922, will be required to take all three subjects again in March, 1923, (b) that all students who have not completed the Fourth Degree Examination by March, 1923, will be required to take all the subjects of that examination at a subsequent sitting; (3) the conditions contained in the second recommendation be applied to the students of the present fourth year.

The tender of Messrs. Beat Bros. for additions to the north wing of the Medical School was accepted.

THE JOURNAL OF THE SYDNEY HOSPITAL.

It would appear that the publication of a hospital journal for propaganda purposes is sound business. For a considerable time the Royal Prince Alfred Hospital has had its affairs kept vividly before the eyes of the charitably inclined by means of its interesting and informative magazine. Recently the managers of the Sydney Hospital have emulated the example of the sister institution and have issued a journal called *Service*, presumably for the same purpose. Two monthly issues have appeared and from them it is possible to anticipate an economic success of the venture. The publication carries a coloured plate on its cover which should attract attention. The reading matter would be more interesting if more space were given to the Sydney Hospital itself. It is probably unavoidable that the personal element enters largely into the pages of a hospital magazine, but *Service* would be improved if stricter anonymity were followed. We wish *Service* a long and happy career, which means a continuous flow of contributions into the coffers of the great hospital of which it is the mouthpiece.

Obituary.

HERBERT ALGAR SWEETAPPLE.

We regret to announce the death of Dr. Herbert Algar Sweetapple, which took place on December 11, 1921, at Goodwood Park, Adelaide.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

The following have been registered under the provisions of the *Medical Act, 1912 and 1915*, as duly qualified medical practitioners:

DICKSON, JOSEPH SYDNEY, L.R.C.P. (Edin.), 1915; L.R.C.S. (Edin.), 1915; L.F.P.S. (Glasg.), 1915, Kurraba Road, Neutral Bay.

For additional registration:

WEBB, JAMES ELI, Ch.M., 1921, Univ. Sydney.

WHITFIELD, STANLEY GEORGE, F.R.C.S., 1921, Univ. Edin., Leura.

YOUNG-WAI, JOSHUA, Ch.M., 1918, Univ. Sydney, 46, College Street, Sydney.

VICTORIA.

THE following have been registered under the provisions of Part I. of the *Medical Act, 1915*, as duly qualified medical practitioners:

BROWN, JAMES, M.B. *et* Ch.B., Edin., 1915; D.P.H., Camb., 1920, Commonwealth Serum Laboratories, Royal Park.

HEYER, FRITZ GEORGE, L.R.C.P. *et* S., Edin., L.F.P.S., Glas., 1903, Blackburn.

ROGERS, JAMES SYDNEY ALEXANDER, L.R.C.P. *et* S., Edin., L.R.F.P.S., Glas., 1921.

The following name has been removed from the Register:
ROBERT JAMISON.

CORRIGENDUM.

IN DR. G. C. WILLCOCK's article on "Palpable Radial Artery," published in THE MEDICAL JOURNAL OF AUSTRALIA of December 3, 1921, on page 506 a line has been dropped by accident. The sentence beginning "If, as Thayer states," in the second paragraph of the left-hand column should continue as follows: "changes in the aorta and mesenteric arteries are similar, some degree of general arterio-sclerosis must exist in such a case. Very few of the men dealt with in these notes presented signs or symptoms of arterio-sclerosis"

Books Received.

A MANUAL OF PRACTICAL ANATOMY: A GUIDE TO THE DISSECTION OF THE HUMAN BODY, by Thomas Walmsley, Professor of Anatomy, Queen's University, Belfast: in three parts: Part II, The Thorax and Abdomen; 1921. London: Longmans, Green & Company; Demy 8vo., pp. 233, with 82 figures. Price: 10s. 6d.

RADIATIONS FROM SLOW-RADIUM, by John B. Kramer, with a Note on Their Therapeutic Value by John Hall-Edwards, L.R.C.P. (Edin.), D.M.R. & E. (Cantab.), F.R.S. (Edin.), Honorary F.R.P.S., Late Major, R.A.M.C.; 1921. London: Baillière, Tindall & Cox; Demy 8vo., pp. 105, with 53 figures. Price: 12s. 6d.

Medical Appointments.

DR. H. L. TOOTH (B.M.A.) has been appointed Government Medical Officer at Bungendore, New South Wales.

DR. W. H. JAMES has been appointed Public Vaccinator in the Upper Yarra Shire, Victoria.

DR. A. RICHARDSON has been appointed on probation at a salary of £606 *per annum* to the position of Quarantine Officer at Newcastle, New South Wales.

DR. D. G. ROBERTSON (B.M.A.) has been appointed on probation without examination to the position of Divisional Director of the Industrial Hygiene Branch of the Commonwealth Department of Health at a salary of £900 *per annum*.

Medical Appointments Vacant, etc..

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

BOURKE DISTRICT HOSPITAL: Medical Officer.

DEPARTMENT OF HEALTH OF THE COMMONWEALTH: Four Travelling Fellowships.

THE MEDICAL JOURNAL OF AUSTRALIA: Assistant Editor.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phoenix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 3, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, 6, Bank of New South Wales Chambers, St. George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

- JAN. 3.—New South Wales Branch, B.M.A.: Council (Quarterly).
 JAN. 10.—New South Wales Branch, B.M.A.: Ethics Committee.
 JAN. 12.—Victorian Branch, B.M.A.: Council.
 JAN. 13.—Queensland Branch, B.M.A.: Council.
 JAN. 13.—South Australian Branch, B.M.A.: Council.
 JAN. 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 JAN. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
 JAN. 25.—Victorian Branch, B.M.A.: Council.
 JAN. 27.—Queensland Branch, B.M.A.: Council.
 FEB. 8.—Federal Committee of the British Medical Association in Australia.
 FEB. 9.—Victorian Branch, B.M.A.: Council.
 FEB. 10.—Tasmanian Branch, B.M.A.: Annual Meeting.
 FEB. 10.—Queensland Branch, B.M.A.: Council.
 FEB. 10.—South Australian Branch, B.M.A.: Council.
 FEB. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
 FEB. 21.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)